



V. 29

Library
of the
Academy of Medicine
Toronto.
13922

1923

VOL. XXIX.—1914.

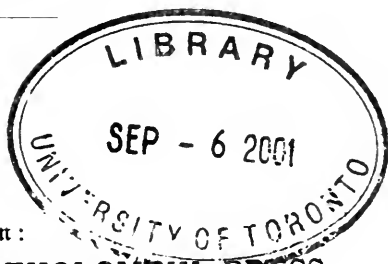
THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, & OTOTOLOGY;

A RECORD OF CURRENT LITERATURE

RELATING TO

THE THROAT, NOSE, AND EAR.

PUBLISHED MONTHLY.



London:

ADLARD AND SON, BARTHOLOMEW PRESS
BARTHOLOMEW CLOSE, E.C.

ENTERED AT STATIONERS' HALL.

THE JOURNAL OF LARYNGOLOGY RHINOLOGY, AND OTOTOLOGY.

Founded in 1887 by **MORELL MACKENZIE** *and* **NORRIS WOLFENDEN.**

EDITORIAL COMMITTEE:

A. H. CHEATLE, F.R.C.S. (<i>Pres. Otol. Sect. Internat. Cong.</i>).	J. MACINTYRE, M.B., C.M., (<i>Glasgow</i>).
DUNDAS GRANT, M.A., M.D., F.R.C.S. (<i>London</i>).	SIR W. MILLIGAN, M.D., M.Ch. (<i>Manchester</i>).
ALBERT A. GRAY, M.D. (<i>Glasgow</i>) (<i>Pres. Otol. Sect. R.S.M.</i>).	SIR STCLAIR THOMSON, M.D., F.R.C.S. (<i>London</i>) (<i>Pres. Laryng. Sect. Internat. Cong.</i>).
WILLIAM HILL, M.D. (<i>London</i>) (<i>Pres. Laryng. Sect. R.S.M.</i>).	LOGAN TURNER, M.D. (<i>Edinburgh</i>).
	P. WATSON-WILLIAMS, M.D. (<i>Bristol</i>).
	MACLEOD YEARSLEY, F.R.C.S. (<i>London</i>).

EDITOR:

DAN MCKENZIE, M.D., F.R.C.S.E. (*London*).

WITH THE CO-OPERATION OF THE STAFF OF ABSTRACTORS:

DRS. J. STODDART BARR (*Glasgow*), H. S. BIRKETT (*Montreal*), BRADY (*Sydney*,
N.S.W.), JOHN DARLING (*Edinburgh*), DONELAN (*London*), CLAYTON FOX (*London*),
J. S. FRASER (*Edinburgh*), PERRY GOLDSMITH (*Toronto*),
THOS. GUTHRIE (*Liverpool*), A. HUTCHISON (*Brighton*), J. D. LITHGOW (*Edinburgh*),
A. MCCALL (*Bournemouth*), CHICHELE NOURSE (*London*), W. G. PORTER (*Edinburgh*),
PRICE-BROWN (*Toronto*), KNOWLES RENSHAW (*Manchester*),
LINDLEY SEWELL (*Manchester*), ALEX. R. TWEEDIE (*Nottingham*),
RAYMOND VEREL (*Aberdeen*), C. E. WEST (*London*), G. HAROLD L. WHALE
(*London*), WRIGHT (*Bristol*), and WYLIE (*London*).

AND THE ASSISTANCE OF

MR. GEORGE BADGEROW (*London*), DRs. J. BARR (*Glasgow*), HUGO FREY (*Vienna*),
GRAZZI (*Florence*), MIDDLEMASS HUNT (*Liverpool*),
A. BROWN KELLY (*Glasgow*), E. LAW (*London*), MASSEI (*Naples*),
D. PATERSON (*Cardiff*), URBAN PRITCHARD (*London*), F. A. ROSE (*London*),
A. SANDFORD (*Cork*), SENDZIAK (*Warsaw*), H. TILLEY (*London*),
E. WAGGETT (*London*), R. WOODS (*Dublin*).

LIST OF PLATES.

	TO FACE PAGE
TO ILLUSTRATE DR. URBAN PRITCHARD'S ARTICLE ON EXTRA MACULÆ FOUND IN THE AMPULLÆ OF SOME BIRDS	2
FIG. 1.—SECTION OF THE MACULA ACUSTICA OF THE SACCULE OF THE CAT. × 200 DIAM.	
FIG. 2.—SECTION OF THE NIGHTINGALE'S AMPULLAR REGION.	
FIG. 3.—ANOTHER SECTION THROUGH THE FAN-SHAPED BODY.	
TO ILLUSTRATE DR. A. LOGAN TURNER'S ARTICLE ON A PECULIAR FORM OF HYPERPLASIA OF THE MUCOUS MEMBRANE OF THE UPPER RESPIRATORY TRACT.	
PLATE I—COLOURED PLATE OF THE FAUCES AND PHARYNX	59
PLATE II, FIG. 1.—BLACK AND WHITE SKETCH OF THE FAUCES AND PHARYNX	60
FIG. 2.—THE UPPER LARYNGEAL APERTURE.	
PLATE III, FIG. 3.—MICROSCOPIC SECTION OF MUCOUS SUR- FACE. × 60 DIAM.	61
FIG. 4.—THE SAME. × 200 DIAM.	
INTRA-NASAL OPERATIONS FOR FRONTAL SINUS SUPPURATION. P. WATSON-WILLIAMS.	
PLATE I, FIG. 1.—TO SHOW THE POINT OF ENTRY IN THE INTRA-NASAL FRONTAL SINUS OPERATION	226
FIG. 2.—TO SHOW THE AUTHOR'S SMALL SPHENO-ETHMOIDAL FORCEPS.	
FIG. 3.—THE SLIDING CUTTING FORCEPS REDUCING THE CRISTA NASALIS.	
PLATE II, FIG. 1.—SKIAGRAM SHOWING THE 6 MM. THICK BOUGIE ENTERING FRONTAL SINUS	234
FIG. 2.—THE SAME, SHOWING THE 6 MM. BOUGIE.	
FIG. 3.—LATERAL VIEW OF FRONTAL SINUS AND SWAN- HEAD BOUGIE.	
FIG. 4.—THE SAME, ANTERO-POSTERIOR ASPECT.	
PLATE III, FIG. 1.—LARGE BOUGIES IN BOTH FRONTAL SINUSES (SKIAGRAM)	236
FIG. 2.—SKIAGRAM SHOWING ENDO-RHINOSCOPE IN FRONTAL SINUS.	
FIG. 3.—THE GUARDED ELECTRIC BURR REDUCING THE CRISTA NASALIS.	
FIG. 4.—THE 6 MM. BURR ON NASAL CREST.	

THE INTRA-NASAL TREATMENT OF EMPYEMA OF THE FRONTAL SINUS.
HERBERT TILLEY.

- PLATE I, FIG. 2.—LATERAL WALL OF NOSE SHOWING AGGAR CELL AND FRONTAL SINUS 248
- FIG. 3.—LATERAL WALL OF NOSE SHOWING AGGAR CELL AND ETHMOIDAL BULLA.
- PLATE II, FIG. 4.—SITE OF ACCESS TO ANTERIOR GROUP OF ETHMOIDAL CELLS 252
- FIG. 5.—ETHMOIDAL REGION WITH REMOVAL OF ANTERIOR CELLS.

ACUTE SUPPURATIVE OTITIS MEDIA, PURULENT LABYRINTHITIS AND LEPTOMENINGITIS WITHOUT RUPTURE OF THE TYMPANIC MEMBRANE. J. S. FRASER.

- PLATE I, FIG. 1.—HORIZONTAL SECTION THROUGH NORMAL LEFT EAR OF INFANT IN REGION OF OVAL WINDOW . . . 286
- FIG. 2.—HORIZONTAL SECTION THROUGH LEFT EAR OF PRESENT CASE ABOUT SAME LEVEL AS FIG. 1.
- FIG. 3.—HORIZONTAL SECTION THROUGH NORMAL LEFT EAR OF INFANT IN REGION OF ROUND WINDOW.
- FIG. 4.—HORIZONTAL SECTION THROUGH LEFT EAR OF PRESENT CASE ABOUT SAME LEVEL AS FIG. 3.
- PLATE II, FIG. 5.—HORIZONTAL SECTION THROUGH LEFT EAR OF PRESENT CASE 288
- FIG. 6.—DITTO.
- FIG. 7.—DITTO.
- FIG. 8.—DITTO.
- (EACH FIGURE SHOWING DIFFERENT STRUCTURES.)
- PLATE III, FIG. 9.—HORIZONTAL SECTION THROUGH RIGHT EAR OF PRESENT CASE 290
- FIG. 10.—DITTO.
- FIG. 11.—DITTO.
- FIG. 12.—DITTO.
- (EACH FIGURE SHOWING DIFFERENT STRUCTURES.)

SUSPENSION LARYNGOSCOPY AND ITS PRACTICAL USE. G. KILLIAN.

- FIG. 31.—THE VIEW IN SUSPENSION LARYNGOSCOPY. EPI-GLOTTIS EXPOSED 398
- FIG. 32.—DITTO. THE LARYNX EXPOSED.

DIATHERMY IN THE TREATMENT OF INOPERABLE GROWTHS OF THE NOSE AND THROAT. W. D. HARMER.

- FIG. 1.—CANCER OF LARYNX, BEFORE TREATMENT . . . 481
- FIG. 2.—CANCER OF PALATE, BEFORE TREATMENT.
- FIG. 3.—DITTO. AFTER TREATMENT.

ILLUSTRATIONS IN TEXT.

PAGE

TUMOUR OF SOFT PALATE CONSISTING MAINLY OF SALIVARY GLAND TISSUE. THOS. GUTHRIE.	
FIG. 1.—VIEW OF FAUCES	69
FIG. 2.—SECTION THROUGH THE WHOLE TUMOUR. $\times 5$	70
FIG. 3.—SECTION OF PART OF THE TUMOUR. $\times 200$	70
NOTE ON THE TECHNIQUE OF THE INTRA-NASAL OPERATION FOR ANTRAL SINUS SUPPURATION. P. WATSON-WILLIAMS.	
FIG. 1.—PUNCH FORCEPS	114
FIG. 2.—DRAWING TO SHOW THE AUTHOR'S INTRA-NASAL ANTRAL OPERATION	115
THE INTRA-NASAL TREATMENT OF LACHRYMAL DISEASE. D. R. PATERSON.	
FIG. 1.—SECTIONS SHOWING THE RELATIONS OF THE LACHRYMAL FOSSA AND NASO-LACHRYMAL DUCT	170
FIG. 2.—FRONTAL SECTION OF PREPARATION. A. ANTERIOR SEGMENT. B. POSTERIOR SEGMENT	171
FIG. 3.—DISSECTION SHOWING PARTS ABOUT LACHRYMAL SAC AND DUCT	172
FIG. 4.—SKIAGRAM OF STYLE WHICH HAD BEEN PASSED THROUGH THE SAC-WALL INTO THE MIDDLE MEATUS	175
FIG. 5.—DIAGRAM OF LACHRYMAL SYSTEM TO ILLUSTRATE PRINCIPLE OF OPERATION	176
FIG. 6.—OPERATION AS DONE BY WEST	178
FIG. 7.—ELEVATOR OF MUCO-PERIOSTEAL FLAP AND CHISELS	179
FIG. 8.—FINE-TOOTHED FORCEPS	179
NOTE ON THE HISTOLOGY OF ENUCLEATED TONSIL. WYATT WINGRAVE.	
FIG. 1.—SECTION THROUGH THE BED OF THE TONSIL	182
FIG. 2.—THE SAME STAINED TO SHOW ELASTIC FIBRES	182
FIG. 3.—SECTION TO SHOW ELASTIC FIBRES	183
A NEW THEORY OF HEARING. F. P. STURM.	
FIG. 1.—HAIR CELLS	194
FIG. 2.—DIAGRAM ILLUSTRATING THE SILENT AND THE SOUND-ADAPTED EAR	195
INTRA-NASAL FRONTAL SINUS OPERATION. P. WATSON-WILLIAMS.	
METHOD OF ENTERING AND OPENING UP FRONTO-ETHMOIDAL CELLS	210
INTRA-NASAL OPERATIONS FOR FRONTAL SINUS SUPPURATION. P. WATSON-WILLIAMS.	
FIG. 1.—SULLIVAN'S RASPATORIES	227
FIG. 2.—SEGURA'S RASPATORIES AND CURETTES	229
FIG. 3.—DIAGRAM OF ETHMOIDAL LABYRINTH AND FRONTO-ETHMOIDAL CELLS	231

	PAGE
FIG. 4.—BONE-SPECIMEN SHOWING THE FRONTO-NASAL PAS- SAGE	231
FIG. 5.—THE AUTHOR'S SPHENO-ETHMOIDAL ANGULAR FOR- CEPS	233
FIG. 6.—THE SLIDING CUTTING FORCEPS	233
FIG. 7.—THE AUTHOR'S GUARDED ELECTRIC BURRS	233
FIG. 8.—THE AUTHOR'S FRONTAL SINUS BOUGIES	233
FIG. 9.—THE AUTHOR'S SMALL RASPATORY	235
FIG. 10.—THE AUTHOR'S FRONTAL SINUS CANNULÆ	237
FIG. 11.—DIAGRAM TO ILLUSTRATE THE POINT OF ENTRY OF CURETTE	240
FIG. 12.—DIAGRAM SHOWING MUCO-PERIOSTEAL FLAP	241
THE INTRA-NASAL TREATMENT OF EMPYEMA OF THE FRONTAL SINUS. HERBERT TILLEY.	
FIG. 1.—LATERAL WALL OF NOSE	246
THE RHINOGENIC AND OTOGENIC LESIONS OF THE THIRD, FOURTH, FIFTH, AND SIXTH CRANIAL NERVES. LADISLAUS ONODI.	
FIG. 1.—GASSERIAN GANGLION AND SPHENOIDAL SINUS	308
FIG. 2.—DITTO	309
FIG. 3.—SECOND DIVISION OF THE TRIGEMINUS AND THE SPHENOIDAL SINUS	310
FIG. 4.—SPHENOIDAL SINUS AND NEIGHBOURING NERVES	311
FIG. 5.—SPHENOIDAL SINUS AND ABDUCENS	312
FIG. 6.—SPHENOIDAL SINUSES	361
FIG. 7.—SPHENOIDAL SINUS, FORAMEN ROTUNDUM, AND SUPERIOR ORBITAL FISSURE	361
FIG. 8.—DITTO	362
FIG. 9.—FRONTAL SINUS AND SUPERIOR ORBITAL FISSURE	363
FIG. 10.—SPHENOIDAL SINUS AND VIDIAN CANAL	364
FIG. 11.—APEX OF PETROUS BONE AND SIXTH NERVE	367
SUSPENSION LARYNGOSCOPY AND ITS PRACTICAL USE. G. KILLIAN.	
FIG. 1.—VIEW WITH SUSPENSION LARYNGOSCOPY IN THE CADAVER	338
FIG. 2.—SPATULA HOOK IN ITS EARLIEST FORM	339
FIG. 3.—GUTTER-SPATULA	342
FIG. 4.—FLANGED GUTTER-SPATULA	343
FIG. 5.—DOUBLE SPATULA	343
FIG. 6.—DOUBLE SPATULA WITH EPIGLOTTIS ELEVATOR	344
FIG. 7.—SUSPENSION HOOK	345
FIG. 8.—MOUTH GAG	346
FIG. 9.—SUSPENSION HOOK WITH MOUTH-GAG	346
FIG. 10.—SUSPENSION HOOK, ETC., SEEN FROM SIDE	347
FIG. 11.—COUNTER-PRESSOR	348
FIG. 12.—COUNTER-PRESSOR EXTENDED	349
FIG. 13.—SUSPENSION HOOK WITH SPATULA AND COUNTER- PRESSOR	350
FIG. 14.—THE GALLOWS	351
FIG. 15.—OPERATING TABLE LOWERED	352
FIG. 16.—OPERATING TABLE RAISED	353

	PAGE
FIG. 17.—OPERATING TABLE. HEAD ASPECT . . .	354
FIG. 18.—OPERATING TABLE. HEAD SUPPORT . . .	355
FIG. 19.—SUSPENSION HOOK, ETC., ON OPERATING TABLE . . .	356
FIG. 20.—GLASS PROTECTOR ON GALLOWES . . .	357
FIG. 21.—OPERATING INSTRUMENTS . . .	357
FIG. 22.—FISCHER'S CLIP HOLDER . . .	358
FIG. 23.—WOLFF'S HEAD LAMP . . .	358
FIG. 24.—TRANSFORMER WITH HEAD LAMP . . .	359
FIG. 25.—WATER SUCTION AIR-PUMP . . .	359
FIG. 26.—LAMP FOR GAG . . .	360
FIG. 27.—HANDLE FOR TONGUE SPATULA . . .	394
FIG. 28.—BRAUN'S BELLOWS APPARATUS . . .	394
FIG. 29.—INTRODUCTION OF SUSPENSION HOOK . . .	396
FIG. 30.—SUSPENSION LARYNGOSCOPY . . .	397
FIG. 33.—THREE CHANELLED BRONCHOSCOPY TUBE . . .	402
FIG. 34.—THREE CHANELLED TUBE, ETC. . .	403
FIG. 35.—SUSPENSION BRONCHOSCOPY . . .	404
FIG. 36.—ALBRECHT'S HOT-AIR BOX . . .	406
FIG. 37.—APPLICATION OF MESOTHORIUM . . .	408
A CASE OF PARALYSIS OF THE EXTERNAL RECTUS MUSCLE DUE TO THE PRESENCE OF AN ABSCESS IN THE APEX OF THE PETROUS PYRAMID, ETC. GEO. WILKINSON.	
FIG. 1.—TEMPORAL BONE VIEWED FROM ABOVE . . .	412
FIG. 2.—SECTION THROUGH TEMPORAL BONE . . .	413
BI-SUBMUCOUS RESECTION OF SEPTUM NASI. J. V. D. H. LEONHARD. ILLUSTRATING THE OPERATION . . .	420
DIATHERMY IN THE TREATMENT OF INOPERABLE GROWTHS OF THE NOSE AND THROAT. W. D. HARMER.	
FIG. 4.—NÆVUS OF FACE. BEFORE TREATMENT . . .	484
FIG. 5.—DITTO. AFTER TREATMENT . . .	485
ON THE MINIMIZING OF HÆMORRHAGE IN EXTIRPATION OF THE TONSILS, ETC. WM. HILL AND G. J. F. ELPHICK.	
THE ELPHICK HÆMOSTATIC GUILLotine . . .	549

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

EXTRA MACULÆ FOUND IN THE AMPULLÆ OF SOME BIRDS.

By URBAN PRITCHARD,

Emeritus Professor of Aural Surgery, King's College, London.

IN August, 1912, at the International Otological Congress at Boston, U.S.A., and last year at the International Medical Congress in London, I showed some microscopical sections of a bird's labyrinth in which I had recently discovered extra nerve terminations in a large cavity connected with the ampulla, and since then I have further confirmed these observations in other specimens.

All these sections I had cut some years ago when working at the cochlea.

Over and above the nerve epithelium found on the crista acustica of the ampulla, there are in some birds, such as the nightingale and probably other migratory birds, large areas of similar nerve terminations lining the walls of the extra ampulla cavity and the surfaces of a certain fan-shaped body (described by Dr. Albert Gray in his valuable work on the labyrinth)¹ contained in this cavity.

The existence of these extra maculæ has not, I believe, been demonstrated before, although Dr. Gray evidently suspected it from his macroscopical observations. Unfortunately I have not examined the semicircular canals of a sufficient number of birds to justify me in stating more than that these extra maculæ exist in some birds, together with the fact that they have so far not been found

¹ Albert Gray's "Labyrinth of Animals," p. 98, vol. ii.

in any of the mammals or the other lower vertebrates (reptiles, amphibians or fishes).

Considering the importance of an extra acute sense of orientation to birds¹ for flying, especially to the migratory birds, it is natural that they should require much larger areas of nerve terminations in the semicircular canals.

It is worthy of note that the cilia of the nerve-cells of these extra maculæ are identical with those of the crista acustica, and differ markedly from the cilia of the maculæ of the saccule and utricle of the vestibule; and again that they differ still more from the cilia of the cells of Corti in the cochlea.

The cilia of the cells of Corti are very short and bristle-shaped, being arranged in a row of four to each cell of Corti. The cilia of the vestibule are of two alternating forms, one bristle-shaped and the other thorn-shaped,² and are considerably larger and longer than those of the organ of Corti.

Lastly, the cilia of the ampullar crista are still longer, needle-shaped and wavy, so that the bird's extra ampullar maculæ are easily distinguished from the vestibular maculæ.

In conclusion, having regard to the marked difference between the vestibular and the ampullar nerve-endings, I suggest that it is reasonable to suppose that their functions are not the same. In other words, may not the functions of the posterior labyrinth (saccule, utricle and semicircular canals) be more complicated than we at present believe? And, carrying this idea a little further, I suggest that the vestibule with its otolith mass furnishes the static sense, and the semicircular canals the sense of motion.

TOTAL DEAFNESS, ASSOCIATED WITH THE SYMPTOM-COMPLEX DESCRIBED BY BÁRÁNY,³ IN WHICH COMPLETE RESTORATION OF HEARING OCCURRED.

BY ROBERT BÁRÁNY.⁴

I HAVE already seen quite a series of cases of advanced deafness associated with the symptom-complex, described by me, in whom

¹ Dan McKenzie, "The Semicircular Canals and Sense of Position or Orientation," *Proc. Roy. Soc. Med.*, p. 141, 1912.

² Urban Pritchard, "Termination of Nerves in the Vestibule and Semicircular Canals," *Journ. of Anat. and Physiol.*, 1878.

³ As demonstrated by me at a meeting of the Imperial and Royal Medical Society in Vienna, January 10, 1913.

⁴ From the *Wien. klin. Woch.*, No. 4, 1913.



FIG. 1.—Section of the macula acustica of the sacculus of the cat, $\times 200$ diam. Showing the shorter stiff vestibular cilia.



2.—Section of the nightingale's ampullar region, $\times 40$ diam. Showing the fan-shaped body of Gray, with ciliated cells on the top and side.

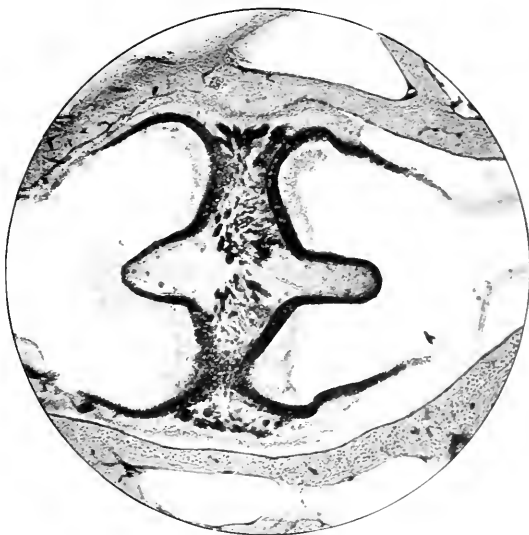


FIG. 3.—Another section through the fan-shaped body, $\times 50$ diam. Showing the long needle-shaped cilia. Note the length of these cilia compared with the vestibular cilia, $\times 200$ diam., Fig. 1.

TO ILLUSTRATE DR. URBAN PRITCHARD'S ARTICLE ON EXTRA MACULE FOUND IN THE AMPULLE OF SOME BIRDS.

sustained restoration of the hearing took place—in one instance this recovery has been maintained for a year after deafness which had been present for many months. The course of the following case, however, is so remarkable as to merit publication at length.

A girl, aged twenty, came under my care at the University Aural Clinic in May, 1911. She stated that she had an acute inflammation of the right ear in December, 1910, which healed but had left giddiness, pain at the back of the head, especially behind the ear, and deafness and tinnitus on the right side.

Examination revealed a normal drumhead, tenderness most marked behind the mastoid process (not, however, suggesting underlying suppuration), deafness as would be caused by a nerve lesion, maintained but impaired caloric reaction of the right vestibule, and deviation of the right hand outwards (palm down). I had already seen twelve similar cases, and in accordance with the reasoning which I had laid before the Neurological meeting of November 14, 1911 (*Wien. klin. Woch.*, 1911, p. 1815), I regarded the most probable diagnosis to be a localised collection of fluid in the cerebello-pontine angle. I showed this patient with this diagnosis at the Neurological meeting, June 13, 1911. As I had witnessed return of the hearing, cessation of the giddiness and tinnitus and headache after lumbar puncture in an earlier analogous case of complete left-sided deafness, I drew off some lumbar fluid in this patient on June 24, 1911. This was clear and not under pressure (110 mm.)—3 c.cm. were taken. I had warned the patient that possibly immediately after the puncture her symptoms might become considerably worse, since I had seen this occur in my first case, but in this instance the right posterior headache became more terrible, the vomiting more continuous, and the giddiness more intense and persistent than I have ever witnessed. As these symptoms remained unchanged and unaffected by all drugs for six days I determined on further operation, and, since I considered that there was an increase of pressure in the right posterior fossa, I exposed the dura in this situation. The mastoid process and dura appeared to be completely normal. By pushing in a swab over the internal meatus I massaged lightly the adjacent dura. The effect of this operation was startling. Immediately on the return of consciousness the patient said all headache had gone, and at the same time the giddiness and vomiting ceased. After this I went on a holiday, and did not see the patient again till the middle of August.

I found then that her symptoms had not returned and that her

hearing had slightly improved. Before the operation her range for whisper and conversation had been 0·25 and 1 m.; it was now 0·75 and 2 to 3 m. respectively. The caloric reaction was still less on the right side. On August 29, to my extreme astonishment, I found the hearing on the *right* completely normal, whilst that on the *left* side was reduced, and the patient reported that the headache on the *right* side had quite ceased, but that for the last few days she had had pain at the back of the head, tinnitus and deafness on the *left* side. Indeed, the same series of symptoms formerly referred to the right now appeared on the left. Within a few days the hearing on the left was reduced to whisper *ad concham*, conversation 10 cm. Accordingly I again performed lumbar puncture, but this time without any effect. Some days later I exposed the dura on the left, with the result that the headache disappeared for a time, but later the symptoms returned with increased severity. As no response took place to any drug, and as I still considered the trouble was due to a localised collection of fluid in the left cerebello-pontine angle, I slit the dura in the left posterior fossa on November 27, 1911. With a blunt instrument I explored round the internal meatus by way of detecting adhesions, which I thought might possibly be in that situation; a fairly large amount of fluid escaped, but yet I did not consider I had opened the cistern itself. The wound was closed and healed *per primum*. As a result of this procedure the headache of which the patient had much complained was lost, the giddiness also was considerably relieved, but the hearing was unaffected—indeed, it became so much worse that by the beginning of 1912 the left ear was totally deaf. This condition remained unaltered till about December 27, 1912, when the patient came stating that for the last two days she had had severe pain behind the left ear. A carious left upper molar was extracted without any effect on this. Giddiness and extreme tinnitus on the left side followed. She had also noticed that she could again hear with the left ear, and simultaneously the tinnitus, headache and giddiness had ceased. Tested with my noise apparatus in the right ear, whisper 0·25 to 0·5 m. and conversation up to 5 m. on the left side. Deviation of the left wrist-joint was still present.

On January 2, 1913, the patient again complained of pain in the bone behind the left ear. She reported that she had heard nothing since December 29, and that to-day she heard worse than at her last visit. Examination showed whisper 10 cm., conversation 2·5 m. The mastoid process was tender along its posterior

border. On January 4, 1913, fresh changes occurred. The left ear was totally deaf again, but the pain had ceased. On January 10, at her next visit, she stated that the hearing had returned on January 8, and examination disclosed whisper 2 m. with the noise apparatus, and without the noise apparatus over 5 m. There was now no deviation in the left wrist-joint, and no giddiness, tinnitus or pain. I showed the patient in this condition without knowing if this cure would be maintained. I also stated that in September, 1912, for a short time the hearing in the right ear was much reduced (whisper 1 m.), unaccompanied by pain, but in a few days this spontaneously improved, and that now the hearing on both sides was normal.

The case is remarkable, as the hearing was completely restored in the left ear, which had been totally deaf so long. What was the cause of this we do not know. The severe attacks of giddiness associated with vestibular nystagmus, the impaired caloric reaction, the isolated deviation in the left wrist-joint—the diseased side—and the absence of any other hysterical stigmata were all against hysteria, which might otherwise have suggested itself as the solution. We are forced to regard the raised localised pressure of the cerebro-spinal fluid as the cause, either by producing a paresis of the cochlear nerve, or loss of function in the end-organs by increased intra-labyrinthine pressure. The possibility of a localised raised pressure in the cerebello-pontine angle accords with the topography of this region. The eighth nerve lies within the so-called cisterna pontis lateralis, a portion of the subarachnoid space formed by folds of the arachnoid membrane. Through apertures in this membrane the normal excretion of the contents of the space occurs. Into the cistern immediately posterior to the eighth nerve the lateral choroid plexus projects, and it is from this source that the secretion in the cistern is derived. Now supposing any pathological conditions take place in the wall of the cistern as the result, for instance, of serous meningitis associated with middle-ear disease, influenza, syphilis and so forth (I have already described my ideas as to the aetiology at the German Otological Meeting, 1912), then, a localised raised pressure will obtain within the cistern which *via* the sheath of the eighth nerve is also felt in the labyrinth. A return to the normal balance between secretion and excretion in this situation is theoretically possible either by a diminution of secretion or by a lesion of the obstruction to the normal methods of excretion. This latter, or perhaps both events, appear to me to be the possible effect of lumbar puncture, which will first give rise to an increase

of the local pressure associated with an increase of symptoms, and then to laceration of adhesions and re-establishment of communications. Many patients, indeed, state that they feel as if something had broken at the back of the head, and that then the symptoms disappear. Possibly also the increase of the local pressure is sufficient to check the process of secretion and thus a cure results. In corroboration of my suggestion as to the part increased secretion plays I have given atropin in some cases, with a remarkably favourable result in one instance. Thus, too, drugs which tend to reduce blood-pressure might be tried by way of limiting secretion, or conversely, from the other point of view, with drugs which tend towards increased secretion, such as alcohol, one would expect an increase in the symptoms as the immediate effect, followed possibly by cure. In one case under my observation a slight alcoholic excess was followed by cessation of headache, tinnitus and giddiness which had lasted for a whole week and which after more than a year had not returned.

I have seen thirty-five cases of this symptom-complex which I have described. Two cases which have come under my care during the last month suggest that the condition is yet more common than I have hitherto suspected. One, a man, aged forty, came to me in October, 1912, with the story that he had suffered with severe tinnitus on the left side for some time, but that his hearing was good. On examination I found the hearing normal for the watch, speech, and upper tones, but considerably depreciated as regards the lower and middle tones. No obstructive deafness, however, was present, as the results to both Rinne's and Weber's tests undoubtedly proved, but an inner ear lesion. There was no giddiness, headache or deviation, but only a peculiar feeling as of the movement of fluid in the head when he shook it. Some long time ago the patient had had lues. With especial consideration for the reports of Zaloziecki and Frühwald (*Wien. klin. Woch.*, 1912, p. 1115) I performed lumbar puncture and drew off 5 c.cm. Two days later the patient reported that on the afternoon following this operation the tinnitus had ceased. Examination of the hearing proved it to be again normal. This, therefore, constituted an incipient case of my symptom-complex. The patient, who since then had one slight relapse, remains cured. For some weeks I have not since seen him. The second case was that of a woman, aged thirty-five, who at the end of October suffered with severe tinnitus. There was a minimal affection of the inner ears, intermittent giddiness and slight feeling of pressure posteriorly on the

right side of the head. No headache, no deviation. I regarded it as a case of my symptom-complex, but could not make it entirely agree. Fourteen days later, however, she came with all the symptoms—giddiness, vestibular nystagmus, considerable depreciation of hearing of the “inner ear type,” right posterior headache, tenderness behind the mastoid process, and deviation of the wrist-joint on the affected side outwards. The case is still under treatment, but I feel certain that it belongs to this category. Such incipient cases will now probably be found more frequently, and that chiefly in connection with aural practice. This explanation may perhaps constitute the solution of the improvement obtained by lumbar puncture in cases of giddiness, tinnitus, and also of the hearing by Babinski, who was the first to recommend it for these affections (“Sur le traitement des affections de l’oreille et en particulier du vertige auriculaire par la rachicentèse,” *Ann. des Mal. de l’Oreille*, vol. xxx, p. 101, 1904).

ALEX. R. TWEEDIE (*Trans.*).

THE SCABBARD-TRACHEA AND PULMONARY EMPHYSEMA.¹

BY PROF. KAHLER
(Freiburg i. Br.).

THE first opportunity I had of making the observation I am now about to report arose during the examination of a man, aged sixty-eight, who had come to the Vienna Clinic on account of difficulty of breathing of long duration. During quiet respiration stridor could be plainly heard both on inspiration and on expiration. The larynx was normal. Indirect tracheoscopy revealed a well-marked scabbard-shaped compression of the trachea, beginning in the upper part of the organ. There was no evidence of goitre on palpation. A remarkable fact in the case was that the larynx was situated very low in the neck, the cricoid cartilage being palpable in the episternal notch. In order to clear up the difficulty direct tracheoscopy was resorted to, and what we discovered was as follows: At the level of the third ring a marked narrowing of the trachea began, due to protrusion of the lateral part of the wall, the lumen being reduced to a chink about 3 mm. in width. This stenosis extended over eight tracheal rings. After

¹ Read at the meeting of the Verein deutscher Laryngologen at Stuttgart, May, 1913.

getting through the stenosis it was seen that the right side of the trachea appeared to be flattened in its remaining portion also. On the left side, below a normal stretch, a very marked bulging inward was seen corresponding to the position of the aorta. At this place pulsation was quite plainly evident. This finding led us to suspect that there was a substernal goitre or a mediastinal tumour, but the physical examination lent no support to the idea. Examination of the lungs revealed a high grade of emphysema. The cardiac dulness could not be made out and there was no expectoration. The chest was of the rigid, barrel-shaped type. Examination by means of the X rays also showed nothing but extreme emphysema. As luck would have it, on the very day that this patient was examined I saw in the Vienna Pathological Institute a case of pulmonary emphysema in which a distinctly marked tracheal stenosis was present, and Prof. Ghon, who was making the *post-mortem*, informed me that he had frequently found this deformity of the trachea in emphysema. It gave one the impression that the stenosis was due to the enlargement of the lungs. At once it became clear to me that the patient I had just examined was one of the same kind, and I determined to follow the matter up. Not long after, I had another opportunity of making a tracheoscopic examination of an exactly similar case. This time I observed a phenomenon to which I had paid no attention in the first case: in the act of coughing the lateral walls of the trachea approached one another even to the point of contact. A month later this patient died, and the *post-mortem* showed extreme pulmonary emphysema; on opening the thorax the lungs did not collapse. The apices of the lung were seen to compress the upper part of the trachea. On its right side the lower portion of the trachea was somewhat flattened. On the left, below the portion flattened by the pulmonary apex, a non-stenosed section was visible—probably a consequence of the aorta intervening between lung and wind-pipe—while the lowermost portion of the trachea showed the impression made by the aorta, which was also strikingly marked during life. This aortic impression seemed to be deeper than usual as a result of the enlargement of the lung.

The anatomical finding was so clear and unmistakable that I now set myself to examine other cases of emphysema for similar changes in the air-passages. Thirty-two cases of emphysema were tracheoscoped, and in five of them I found the scabbard-compression of the upper part of the trachea very well marked. In the remaining cases more or less flattening of the lateral tracheal wall was visible—on the

right side more than on the left, and beginning at the level of the fourth or fifth ring as a rule. I should like here to draw attention to a remark made by Brünings in his book, that care must be taken not to mistake the perspective simulation of stenosis of the trachea for a real stenosis. To prevent such an error I always make sure that the stenosis is real by pressing the end of the tube on the tracheal wall. The collapse of the walls in the act of coughing was invariable and very striking, so much so that in marked stenosis the lumen of the windpipe was entirely obliterated. Four cases only showed no evidence of collapse of the walls on forced expiration. These were all, save one, cases in which the emphysema was slight. It would be interesting to see whether this also occurs in acute emphysema. Personally I have only once had an opportunity of investigating such a condition—in a patient aged eighteen—and then I was very pleased to be able to note the same appearances on tracheoscopy. Unfortunately X-ray examination revealed the facts that there were also present a substernal goitre and enlargement of the heart; so that we cannot cite this case as material to the point at issue, since the narrowing of the upper section of the trachea may have been produced by the goitre, and the aortic depression may have been due to the cardiac enlargement. Most of the patients I examined were elderly folk; eight were over 70, eight over 60, seven over 50, four over 40, and three under 30. It is worth noting, for reasons to be mentioned later, that in one patient, aged twenty, an asthmatic with considerable emphysema, undoubted flattening of the tracheal walls could be seen with very marked collapse on coughing.

In addition to those just mentioned, I am able to bring forward two further anatomical illustrations in the shape of a couple of casts of the trachea taken from emphysematous subjects in which the stenosis is quite clearly visible. In both of these the thyroid gland was normal—or atrophied, rather, for it did not extend below the second tracheal ring. Hitherto we have always been accustomed to look upon this deformity as due to the compression of a goitre, but in these cases the existence of a thyroid tumour was excluded by the *post-mortem*. In the cases examined during life the X rays were relied upon to exclude a goitre. It is, to be sure, possible when the trachea lies very deep that the stenosis may be due to the pressure of the adjacent thyroid acting in combination with the dilated lungs.

Doubtless, more marked stenoses occur, but only in extreme cases of emphysema.

In several slight cases I have made casts of the trachea without finding any very decided changes.

A glance through the literature shows that the presence of a scabbard-trachea in emphysema is not unknown to the pathologists. Simmonds has described what he calls "the senile scabbard-trachea"—a deformity which is found generally in elderly males. He found lateral compression of the trachea, not, as in goitre, limited to the thyroid region, but extending as far down as the bifurcation. He supposed that the narrowing was due to ossification of the trachea, or rather to the degeneration of the cartilages which result therefrom—the degenerated cartilage giving way to the pressure of the adjoining organs. What the adjoining organs are, however, he does not say. I have no doubt myself that in most cases it is enlargement of the lung that is responsible, since of his sixty-one cases of senile scabbard-trachea, forty-four were cases of emphysema. Simmonds himself noticed the association of the tracheal deformity with the emphysema, but he looked upon the stenosis as the primary fact and the emphysema as secondary to it.

In the discussion on Simmonds' paper, Bennecke mentioned the frequent association of the scabbard-trachea with emphysema. In all these cases he had found brown degeneration of the cartilaginous rings. He supposed that, as a result of the spasmodic attacks of coughing, a strong contraction of the transverse muscular bundles upon the cartilaginous ring may appear, and that in consequence of the loss of elasticity the anterior segment of the degenerated cartilages may become bent. So much for the literature.

In order to settle whether the theory that tracheal stenosis may be produced by the lungs is well founded, I should like first of all to discuss whether the anatomical relations of the lungs to the trachea are such as to render this compression possible. In Braunn's anatomical atlas there is a frozen section which illustrates very prettily the close relationship of the trachea to the lungs. It is a transverse section of the body at the level of the second dorsal vertebra. On the right side the lung lies in close contact with the trachea; on the left the œsophagus lies between these two structures. This, perhaps, explains the marked flattening of the right tracheal wall which occurred in most of my cases. In all the cases in which the stenosis was found at the first part of the trachea the cricoid occupied a low position, lying deep in the jugular notch, and so the theory that the tracheal compression was due to the lungs is quite in harmony with anatomical fact.

For the tracheal collapse which was observed to occur during forced expiration another explanation may be offered, which we owe to Brünings' beautiful work and to his theory of the variations in the lumen of the air-passages during respiration.¹ Brünings found that during coughing a narrowing of the trachea took place from protrusion of the posterior wall, amounting in children to a complete obliteration of the tracheal lumen. It is thus quite conceivable that the collapse which, in Bennecke's sense, occurs in weakening of the tracheal wall, may be due to the difference in pressure when the glottis is suddenly opened. But with this the anatomical facts which show the most marked compression as corresponding to the apices of the lungs do not agree.

On the other hand, this anatomical finding can be brought into accordance with my ideas in the following manner. What is it that happens in the act of coughing? I am here following the exposition of Tendeloo.² Three phases can be distinguished: (1) A deep inspiration; (2) a forcible expiratory effort with the glottis closed; and (3) opening of the glottis. It is the second of these phases which is of importance to us. During this stage the lower half of the lungs is reduced in bulk, while the upper portion is little, if at all, affected. Now, while the intra-pulmonary pressure in the lower half of the lungs is markedly elevated, that in the upper half is much lower. Consequently the upper half of the lungs is expanded and enlarged by the lower. Numerous observers agree that in emphysematous people the upper intercostal spaces become prominent or bulging as a result of forcible coughing, and Eichhorst saw in such patients during violent coughing a bellied protrusion of the apex of the lung. He once, indeed, saw it as large as a closed fist. If, then, the supra-clavicular fossa and the intercostal spaces can be pressed upward or outward as a result of a rise in intra-pulmonary pressure, then in the same way it is very probable that the trachea may be compressed, and that by the repeated pressure a permanent deformity may ensue. In order to convince myself that the stenosis observed during coughing develops not only as a result of aspiration of the tracheal wall from differences in pressure, I examined two tolerant patients with the "transparent larynx," used by Brünings³ in his investigations, and was able to satisfy myself that flattening of the lateral walls took place during forcible expiratory effort.

¹ "Bronchoskopie und Oesophagoskopie," Wiesbaden, 1910. Pp. 239, ff.

² "Studien über die Ursachen der Lungenkrankheiten," Wiesbaden, 1902.

³ *Loc. cit.*, p. 233.

The next question to be settled is whether the tracheal deformities which I have observed are identical with the "senile scabbard-trachea" of Simmonds. The frequent coincidence of these deformities with emphysema which Simmonds noticed is certainly striking, and in my belief in most of the cases of senile scabbard-trachea the mode of origin I have just described will be found to be the correct explanation. Simmonds found the stenosis only in old people, hence his name for it. But I have found the same changes in a young patient, as I have already said.

How we are to regard those few cases in which emphysema is absent—Oppikofer¹ has also reported a case of this kind—remains a question. We must admit, to be sure, that there may be more than one cause for the deformity. Possibly curvature of the spine—scoliosis or lordosis—may sometimes play a part in its production. The occurrence of a normal trachea in emphysema is easily explained by ossifying processes, but further anatomical research is necessary before we can be quite certain. Bennecke's theory that the stenosis is only produced by the tracheal musculature is disposed of by the fact that the situation of the deformity corresponds to the place where the lungs adjoin the trachea.

These observations have, of course, an important clinical bearing. The fact that the stenosis becomes worse on coughing is some explanation of the frightful dyspnoea of many emphysematous patients, and of the difficulty they experience in expectorating.

D. M. (*Trans.*).

THE USE OF AIDS TO HEARING AND PROSTHESES IN MIDDLE-EAR DEAFNESS.

By W. SOHIER BRYANT, A.M., M.D.,
New York.

WHAT recourse have we in cases of middle-ear deafness which do not respond to treatment? When treatment no longer benefits, when there is nothing more that science can do to improve the condition of the ear and the hearing, when the ear is functionally quite worthless, the recourse of the scientist and the layman alike is to the skilful use of supplementary aids to hearing. The many varieties of these aids, scientifically adapted to the individual case, show brilliantly effective means for supplementing the residual

¹ *Arch. f. Laryngol.*, Bd. xxvi, p. 339.

hearing. The study of the correct application of these aids or prostheses is found in the unwritten craft, passed along, in the main, from teacher to disciple. In this field much personal experience is required for the application of the precepts of the experience of others.

The cases that can best be benefited by aids to hearing are of two groups: First; the so-called chronic middle-ear catarrhal affections, with rigidity or relaxation of the middle-ear sound-transmitting mechanism; and second, the cases of lesions of continuity caused by middle-ear suppuration.

Middle-ear deafness is due to rigidity of the middle-ear sound-conducting mechanism, to its relaxation, or to loss of its continuity. The premise in all these cases of deafness is the impairment of the middle-ear mechanism. Therefore, in order to obtain efficient hearing, the process is to collect, intensify, and transmit the sound through the middle ear by means of some device. The skilful manipulation of certain aids is the solution of this important problem.

The sound which is collected and brought to the cochlea can be greatly increased or brought approximately to normal by the use of (1) ear trumpets; (2) elastic fans; (3) microphones; (4) tympanic splints; (5) artificial drum membranes, which replace the tympanic membrane and bridge over its defects; and (6) tympanic ballast, furnishing a mass to replace the ossicular chain.

The use of ear trumpets, elastic fans and microphones is indicated when the desideratum is an increased volume of sound received by the ear. The adaptation to the individual case is a simple problem. Tympanic splints are indicated in cases when all the parts of the middle ear are present, but when the ligamentous tissues are relaxed. In these cases, collodion serves to keep the parts of the transmitting mechanism in apposition and the drum membrane tense.

We shall direct our attention in this paper especially to prostheses used for the improvement in the hearing lost through middle-ear suppuration, which has been allowed to continue so long that it has permanently injured the sound-conducting mechanism of the middle ear.

The sound collected can be transmitted across conduction gaps by splints and prostheses (artificial drum membranes and tympanic ballast) which restore the acoustic balance. By these methods a much greater volume of sonorous vibration reaches the labyrinthine fluids and the terminal organ of the cochlear nerve and

thereby restores an efficient degree of hearing to ears otherwise useless.

In considering the adaptation of the prostheses, the cases in which their use is indicated may be divided into the following classes: First, the impairment of hearing in cases with perforation of the drum membrane; second, or intermediate group, the impairment of hearing in cases with retention of the stapes, but with total loss of the drum membrane; third, impairment of hearing from total loss of the drum membrane, and also loss of the crura of the stapes. The prostheses required in these three groups are of wholly different construction, and are required for wholly different mechanical purposes.

GROUP I.—CASES OF IMPAIRMENT OF HEARING WITH PERFORATION OF THE DRUM MEMBRANE.

The defects in the drum membrane are corrected by applying over the perforation discs of egg-skin, sized paper, a conical layer of cotton stiffened with collodion, rubber, oil silk, metal, or cotton batting. Cases in which these discs should be applied are those in which the suppuration has ceased, and in which the perforation is not too large. The choice of the prostheses to be used depends largely on individual experience and on the location and size of the loss of tissues. In small perforations up to one third of the tympanic membrane, light, accurately fitting prostheses are the best, such as, for example, those of thin sized paper. When the loss of tissue of the tympanic membrane is two thirds or more, often the large cotton or rubber prostheses are more effective. The weight and size of the prostheses are of great importance in the individual case, especially when the mass prostheses are used.

The paper discs are introduced by ear forceps; an edge is turned up and grasped by the forceps. After the disc has been moistened carefully it is inserted and placed in position. The disc may be made slightly pear-shaped or with a stem, so that it may be easily grasped by the forceps.

Mass prostheses should be fitted for the closure of the perforation; their size must not be allowed to get too bulky as they are not so precisely adjustable as the thin discs. Cotton pledgets can also be used. These are formed in various ways; small, round pledgets like small peas can be used, or a small wisp of parallel fibres of cotton is tied in the middle with a fine thread, and then the cotton wisp is spread out in a fan at each end; or a pinch of

parallel cotton fibre can be used, all the loose or short fibres pulled off, and the ends of the fibres drawn together and rolled up tight, forming a cotton tack. These cotton pledgets may be moistened with antiseptic solution, phenol 2 per cent., bichloride if necessary 1:3000. They can be impregnated with plain or medicated vaseline. All the prostheses should be sterilised before using.

In my practice a woman, aged fifty, suffered the loss of about a third of the anterior half of the tympanic membrane from chronic suppuration. The suppuration had been arrested by local treatment. The other ear had long before totally lost its hearing also through a suppurative process. Application of paper discs on the perforation restored practically normal hearing, and allowed the patient to resume her social and philanthropic occupation. When the paper patch was carried off with the outward growth of the skin, other discs were put on like overlapping shingles, for a period of over one year until finally the perforation closed, leaving a serviceable ear.

GROUP II.—THE INTERMEDIATE GROUP: IMPAIRMENT OF HEARING IN CASES WITH RETENTION OF THE STAPES, BUT WITH TOTAL LOSS OF THE DRUM MEMBRANE.

This group contains the greatest variety of anatomical defects, from loss of the tympanic membrane to loss of the membrane and major ossicles. The conditions found vary widely between these two extremes, and much judgment is required to fit the prostheses to the best advantage.

The prostheses used vary from the light sound-collecting paper discs to the heavy cotton-vaseline tympanic ballast or mass prostheses used as a prop against the promontory and labyrinthine windows. In cases with loss of tympanic membrane and major ossicles I use the heavy prostheses, preferably the cotton-vaseline tympanic ballast, especially after the complete Schwartze-Stacke or radical mastoid operation. Gold-leaf and paper discs have been used on the head of the stapes to amplify the sound-collecting surface.

Of interest in this connection is the case of a woman, aged twenty-five, suffering from left ear labyrinthine deafness and right ear chronic recurrent middle-ear suppuration with pain and mastoid tenderness. There was total destruction of the membrana vibrans, and ossicles present bound in scar-tissue.

The middle-ear discharge and pain was stopped by local treat-

ment, after which Politzer's acoumeter was heard in the right ear at 4 in. With cotton-vaseline tympanic ballast in place, Politzer's acoumeter was heard as far as 96 in.; and the watch, which was not heard before, was heard at 3/60—a serviceable amount of hearing.

This cotton ballast caused recurrence of suppuration. The suppuration recurred every time the prosthesis was worn. My conservative radical operation, which leaves the ossicles intact, was performed to allow the continuous wearing of the tympanic ballast. Convalescence was complete in twenty-two days, including complete epidermisation and desquamation of crusts internally, with no external deformity. Blood-clot dressing was used. After the operation the cotton ballast could be worn without reaction for an indefinitely long time. The hearing distance was increased to 114 in. per Politzer acoumeter.

GROUP III.—IMPAIRMENT OF HEARING DUE TO TOTAL LOSS OF THE DRUM MEMBRANE AND LOSS OF THE CRURA OF THE STAPES.

In this group the use of the heavy tympanic prostheses or tympanic ballast is indicated. The limits of usefulness of these heavy prostheses in these destructive lesions of the tympanum are very wide apart. There is no limit to this usefulness short of normally efficient hearing.

The condition of the middle ear may require a prosthesis in order to bring the hearing up to a working efficiency, but the prolonged use of the prosthesis may at the same time be counter-indicated by the presence of suppuration, either chronic, subacute, or acute. In these cases the inflammatory conditions should first receive treatment by a conservative method, namely, by local application, a modified radical operation, or a conservative radical operation; never by a complete radical operation if this destructive operation can be avoided.

In other cases, owing to the disposition of the tympanic detritus, the tympanum may not be in sufficiently stable equilibrium to tolerate the prostheses. Suppuration results.

These cases also require some operation of the conservative type in order to obliterate the crevices where the infectious material gathers. Possibly the remains of the ossicles and cicatrices are so disposed that the prostheses cannot be placed in an effective position to transmit vibrations to the promontory or windows. In such cases the detritus must be removed with care,

exposing the promontory and windows for the reception of the prostheses.

The following is the history of two cases illustrating the method of procedure in the type of cases belonging to the third group. One patient, a woman, aged thirty-two, was suffering from double chronic middle-ear suppuration, with destruction of the head and the neck of the malleus and attached tympanic membrane, and from very loud, distressing tinnitus. The patient complained of severe headaches. Local treatment soon permanently cured one ear of suppuration and tinnitus. The watch was heard at 2.5/60. The other ear became affected with intermittent suppuration and occasionally mastoid tenderness. The headaches and tinnitus continued. The watch in this ear was heard at 4/60 inches.

A conservative radical mastoid operation was performed on the ear that continued to give trouble. The headaches ceased, but the tinnitus continued. When the ear was healed a tympanic ballast of cotton and vaseline was applied, with the result that the tinnitus stopped instantly, and the hearing was immediately improved to 6/60 per the watch. This result gave the patient an efficient amount of hearing.

Since the operation, eight years ago, the patient's health has become robust. She manipulates the tympanic ballast herself, with resultant improved hearing and control of the tinnitus. The tinnitus always returns as loud as ever when the tympanic ballast gets out of place. The hearing of the non-operated ear has also improved to 6/60 per the watch.

An interesting case which shows the great economic value of these prostheses is that of a patient of mine, who is the active president of a large manufacturing concern, and who has used these tympanic ballast cotton-wool vaseline prostheses for twenty-five years in spite of continuous suppuration. He learned to adjust the prostheses himself and rarely consulted anyone. Without the prosthesis he is wholly incapable of hearing an ordinary conversation. With the prostheses in position he has fulfilled his complicated executive duties for many years. So far no one in his office had ever suspected he had any hearing difficulty. The suppuration compelled him frequently to change the prostheses and cleanse the ear. In the other ear the hearing is more deficient than in the one in which he uses the prosthesis.

He consulted me for relief from pain which was due to mastoiditis. There was a meato-mastoid fistula in the posterior wall

of the canal. This and the middle ear were suppurating profusely. Both were clogged with granulations. Local treatment caused the granulations to disappear and the suppurations to cease. The ear became so stable that a prosthesis could be worn for an indefinite time without inconvenience or irritation. Without the prosthesis the right ear hears at 6 in. Politzer acoumeter; watch 0 by air or bone; ordinary conversation at 7 inches. With cotton ballast the watch is heard at 3·5/60 and the Politzer acoumeter is heard at 14 ft., ordinary conversation at 25 ft., low whisper at 13 ft.

Among the great variety of prostheses some of the most important ones are:

- (1) Yearsley's cotton-wool pledgets.
- (2) Toynbee's rubber discs attached to a metallic wire.
- (3) Hassenstein's (Gotha) modification of Yearsley's membrane. The membrane is attached to a pincette, thus making its introduction and removal easier and supplying an increased pressure.
- (4) Lucac's modification of Toynbee's membrane, consisting in the removal of the metallic button and wire, and in the substitution of a fine rubber tube attached by a solution of gum to the outer surface of the disc. The tube serves for its introduction by means of a probe.

(5) Politzer's modification of Toynbee's membrane consists of an artificial membrane cut from the wall of a heavy indiarubber tube. It is four to five lines long and one and a half or two lines thick. The upper end, through which the wire of Toynbee's membrane is passed, is somewhat broader than the lower. Politzer has further modified Toynbee's membrane by fastening to the disc an artificial stapes to be used in cases when the head, neck and crura of the stapes have been destroyed and only the foot-plate remains.

(6) Gruber, in order to prevent loss of the disc, attaches a thread to the disc and also to the loop in the end of the wire to facilitate extraction should the disc become detached.

(7) Hartmann's artificial membrane is made of whalebone 6-7 cm. long and 1-2 mm. broad, and as thin as possible. After it has been wrapped with cotton it is doubled upon itself to form a loop. It is recommended for the elasticity of the pressure which it makes, for its easy introduction and removal, and as a means of treating the cavity.

(8) Blake recommends the use of a disc of writing-paper in cases of partial destruction of the drum membrane. At the time that the paper improves the hearing it acts as a therapeutic agent.

(9) Spencer recommends an artificial membrane made of absorbent cotton medicated by various solutions for therapeutic and auditory purposes.

(10) Appert's artificial drum membrane, which is made on the suggestion of Bezold, consists of a disc of boric acid cotton as used for surgical dressings prepared and sterilised in boiling water supersaturated with boric acid. This membrane is used in cases with persistent perforation after suppurative otitis media, and is valuable for the improvement of the hearing as well as for the management of both the epithelised and non-epithelised portions of the tympanic mucosa.

These borated cotton prostheses are fixed to a sterilised silk thread and impregnated with warm vaseline. They are then introduced by the patient himself by special forceps. Because of their flexibility they are readily fitted and well tolerated. In suitable cases, especially in simple disturbances of the sound-conduction apparatus, the hearing is considerably improved by the use of these artificial drum membranes, which are changed after an average period of three days. The expense is trifling.

(11) Alt's artificial drum membrane is made of silver leaf. A leaflet of silver is placed in sterile water and rolled into a ball with sterilised instruments. It is then taken from the water and is held over gas flames until it is nearly free from water. In this condition it is introduced through the ear-speculum into the tympanum, pushed against the promontory with sterile cotton, and spread along the promontorial wall with sterilised applicator. These drum membranes are tolerated without reaction.

(12) Jacques recommends a disc of lamellated gutta-percha.

There is a very large variety of prostheses advised by many authors. Their fundamental principles are few and simple; the specific variations were adopted to satisfy individual tastes and circumstances and objects. The leading prostheses now advertised commercially are of two classes—the rubber disc with a stem and the rubber cone.

Suppuration of the middle ear need not be a contra-indication to the use of prostheses while the middle ear is under treatment for the suppuration. Prostheses are contra-indicated in cases still suppurating which are not under treatment because of the possible aggravation of the suppuration from occlusion of drainage and the multiplication of the infection.

The adjustment of the prosthesis is naturally an important item in its use. When properly fitted, the prosthesis immediately

restores a large part of the lost hearing and stops the tinnitus if this distressing condition is present. With precise and careful adjustment the prostheses cause no discomfort whatever; on the contrary, they usually contribute a vast amount to the comfort and confidence of the patient.

AUTHOR'S BIBLIOGRAPHY.

"The Conservation of Hearing in Operations on the Mastoid Region," *Ann. of Otol., Rhinol., and Laryngol.*, March, 1907, vol. xvi, No. 1, pp. 32-35; also *Boston Med. and Surg. Journ.*, March 7, 1907, vol. clvi, No. 10, p. 300.

"Technical Points which Furnish the best Curative, Functional and Cosmetic Results in Mastoid Operations for Extra-dural Lesions," *Amer. Journ. of Surg.*, February, 1910, vol. xxiv, No. 2, pp. 47-51.

"Opportunities for the Preservation of Hearing," *Journ. A. M. A.*, March 22, 1913, vol. lx, No. 12, p. 878.

"The Radical Mastoid Operation Modified to Allow the Preservation of Normal Hearing," *Trans. Amer. Otol. Soc.*, Meeting June 26-27, 1906, vol. x, pt. ii, pp. 292-295; also *New York Med. Journ.*, October 20, 1906, vol. lxxxiv, No. 16, pp. 780-781.

"The Modified Radical Mastoid Operation for the Cure of Otitis Media Purulenta Chronica," *Med. Record*, November 16, 1912, vol. lxxxii, pp. 886-888; also *Trans. XIth Internat. Otol. Cong.*

"The Protective Mastoid Operation," *Surgery, Gynecology and Obstetrics*, 1913.

A NOTE ON THE PATHOLOGY OF OTOSCLEROSIS.

BY KENELM H. DIGBY, M.B., B.S.Lond., F.R.C.S.Eng.,
Late Clinical Assistant, Aural Department, Guy's Hospital; Medical Officer,
Great Central Railway.

THIS disease has two outstanding anatomical features: (1) the Eustachian tubes are unusually patent, and (2) the oval window becomes the seat of a deposit of spongy bone.

The patency of the Eustachian tubes must permit of considerable pressure changes in the tympanic cavity synchronous with those in the naso-pharynx which are produced by blowing the nose, sniffing, speaking, coughing, swallowing, or even breathing. The oval window is thus exposed to intermittent and unphysiological strain. The deposit of spongy bone which results may be compared to the periosteal callus of a sprain fracture or the exuberant callus about an imperfectly fixed fracture, or perhaps more aptly to the "lipping" about a joint when, its mechanism having been permanently disturbed by an injury, it has to suffer unusual strain. In a normal individual the oval window is protected from undue pressure changes from within by the closed Eustachian tube, from

without by the membrana tympani. Failure of the inner barrier causes otosclerosis. As regards the outer, it may be observed that oft-repeated external concussion may (apart from rupturing the membrana tympani) produce deafness. The boiler-maker's deafness resembles otosclerosis in some ways—*e. g.* the high-pitched tinnitus and the paracusis Willisii.

The clinical story of otosclerosis gives some support to the hypothesis. Diseases are not inherited, only the tendency to diseases. Otosclerosis has a family distribution; it is here suggested that patency of the tubes is the hereditary factor. Otosclerosis is sometimes associated with the general pathological widening of the upper air-passages in ozaena. Otosclerosis usually appears towards the end of the period of growth. The external auditory meatus is large and capacious. The tympanic membrane is unusually transparent in the middle, possibly being thin and atrophied as a result of varying intra-tympanic pressures. Politzerising is particularly easy, but aggravates the condition.

This view does not suggest any useful line of treatment, though the patients may be cautioned against blowing their noses. Closure of Eustachian tube by a catheter-cantery would lead to retracted membrane and retention of secretions. Artificial perforation of the membrane would merely substitute external pressures for internal ones. The construction of a valvular flap at the lower end of the Eustachian tubes seems to be impracticable.

CLINICAL NOTE.

LITTLE'S AREA OR THE *LOCUS KIESSELBACHII*.

LAST year it fell to my lot to deliver a clinical lecture on epistaxis, and in the course of my reading I happened upon the fact, to me new, that bleeding from what we now know as the typical spot in the antero-inferior region of the nasal septum had been described by an American, a Dr. James L. Little, in the year before Kiesselbach's classical article on the subject appeared. Little's paper was published in 1879; Kiesselbach's in 1880.

The cumbrous appellation of the *locus Kiesselbachii* has been applied to this spot, but it is evident that if Little's description was published before Kiesselbach's, then the honour, such as it is, of having an area called by his name, should go to the American and not to the German. *Palmarum qui meruit ferat!*

Little's article was published in an American medical journal, the *Hospital Gazette*, but a search instituted by the obliging officials in the library of the Royal Society of Medicine in London failed to bring that

periodical to light. All that we could discover was that the *Hospital Gazette*, after struggling through various incarnations and passing under several different names, had at last totally disappeared, and that therefore there was no method open to us of obtaining from any editor or publisher a copy of the number which contained Little's original paper.

Abruptly brought up, in this way, against a blank wall, the idea occurred to me of writing to the Library of the Surgeon-General's Office at the War Department in Washington. This I did, and by return of post received a complete type-written copy of Little's article. The prompt and generous attention given to my request by the United States War Office Library renders it peculiarly gratifying to me to be able, as a consequence of the information thus obtained, to claim for an American an honour which is justly his due.

There is no need to quote Little's article in its entirety; one paragraph alone will suffice.

After describing four cases of bleeding from the area in question, he goes on to say: "The seat of the ulcer seemed to be in or about the same situation on the septum in all the cases, about half an inch from the lower edge of the middle of the column. The septum at this point is supplied with branches of the anterior ethmoidal artery which anastomose freely with branches of the sphenopalatine artery. The lower portion of the septum is supplied by a branch of the superior coronary—the artery of the septum."

I am no supporter of the custom, hallowed by antiquity though it be, of attaching men's names to anatomical regions, but this memorial having already been instituted we may let it remain. The inscription, however, should be altered, for justice demands that the name attached to it should be that of *Little* and not that of *Kiesselbach*.

Dan McKenzie.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

October 17, 1913.

MR. RICHARD LAKE, *President, in the Chair.*

Abridged Report.

Injury to Ear.—**W. M. Mollison.**—Male, aged forty-three, was admitted to hospital on account of fixation of the left eye, loss of sight, and corneal ulceration following an accident. On July 23, 1913, being then at sea, the patient received a severe blow on the left side of the head from some part of a donkey engine; he was so badly damaged that he was not expected to survive, and little or no treatment was adopted. He made an excellent recovery, and complained only of the loss of sight in the left eye and deafness in the left ear.

On admission it was found that the functions of the third, fourth, fifth, sixth, and seventh cranial nerves on the left side were lost, evidently from the blow, which, no doubt, fractured the skull in the frontal and

temporal regions. The ear condition: The left auricle had been badly crushed. The results of examination of hearing were as follows:

	Right.	Left.
Whisper	2 ft.	—
Weber	←	—
Rinne	+	—
Schwabach normal.		
Upper tone limit	20,000	12,000

The lowest note heard on the left side was g^1 . Rotation showed: Right, ten turns, nystagmus for fifty seconds; left, ten turns, nystagmus ten seconds.

On September 29 an operation was performed on the left ear to restore the meatus; this was successful, and gave the man a considerable amount of hearing. On October 4 the hearing was as follows:

	Right.	Left.
Whisper	10 ft.	1-4 ft.
Weber	—	→
Rinne	+	+
Schwabach as before.		
Upper tone limit	20,000	18,000
Lower tone limit	Normal	Normal
Rotation	Good reaction in both	

The membrane is difficult to see completely, but seems normal. Syringing with cold water on the right gave good reaction in about forty seconds; the left gave reaction much more quickly in about fifteen seconds. The rotatory movements are very prettily seen in the damaged eye. Does this throw any light on the pathology of the eye fixation or on the physiology of the caloric nystagmus?

Mr. C. E. WEST asked how it was that the patient was still able to move the left eye if, as the notes stated, the functions of the third, fourth, fifth, sixth and seventh cranial nerves were lost?

Mr. G. J. JENKINS said that if Mr. Mollison's observations were correct, this patient showed nystagmus in an eye which could not be moved spontaneously. With paralysis of the external rectus it was possible to have nystagmus to the opposite side. He had now under care two cases of so-called congenital absence of the external rectus, and in both those cases one could produce an internal nystagmus in the affected eye, but not an external nystagmus. Bartels held that both recti must be intact for nystagmus to be possible; his experiments were done on animals with monocular vision. These observations seemed to prove that the lesion in Mr. Mollison's case could not have involved the nerve at the base of the skull, and that it probably was a cortical one. This was important, as Wilson had held that the nystagmus centre was situated in the cortex, whereas Bárány placed it lower.

Mr. STUART-LOW said that he understood that Mr. Mollison was at a loss to explain the great degree of deafness still remaining, seeing that the case had progressed so well, and that there was no visible obstruction. It was possible that a blood-clot had formed in the middle ear, a result of the severe and sudden injury sustained, and that the clot had organised. Another explanation suggested itself, namely that the deafness was functional or, indeed, even hysterical, and the lowering of the range of audition present in this case would support such an explanation.

Sero-purulent Lepto-meningitis with Rapid Recovery after Translabrynthine Operation.—Sydney Scott.—The diagnosis was

established by the presence of 3500 polymorphonuclear leucocytes per cubic millimetre in the cerebro-spinal fluid which was withdrawn by lumbar puncture. The meningitis arose in connection with labyrinth disease, secondary to chronic suppurative otitis media, for which the operation of labyrinthotomy (vestibulotomy) had been performed about forty-eight hours before the onset of meningeal symptoms. These symptoms began with severe headache, followed by retraction of the head, rigidity of the cervical extensor muscles, and pyrexia, the temperature rising to 102° F. About fifteen hours later an exploratory lumbar puncture yielded 10 c.c. of turbid cerebro-spinal fluid. The posterior cranial fossa was then drained through an opening made for the purpose into the internal auditory meatus. The cerebro-spinal fluid escaped for fourteen hours through the labyrinth, and another 10 c.c. of turbid fluid also under pressure were withdrawn by a second lumbar puncture. The untoward symptoms then rapidly disappeared. The complication had evidently been recognised in its early stages, when the symptoms were comparatively mild. It must also be observed that no organism could be identified in the films of the pus-cells and the cultures yielded no growth.

A male, aged twenty-eight, a laundry hand, came to hospital on September 12, 1913, complaining of headache, giddiness, tinnitus, deafness, and discharge from the left ear. He had had discharge from the ear for quite ten years. The previous week he began to experience giddiness and headache on turning towards his left. The deafness in the left ear had greatly increased and he experienced constant loud tinnitus; the frontal headache was decidedly worse each day. He had felt sick and had been sick once or twice.

When directed to walk along a straight line he deviated suddenly to the left when the eyes were closed. There was a tendency for the patient to incline the head slightly to one side, while the chin was slightly elevated and turned towards the opposite side. This attitude of the head was corrected when the eyes were opened, but slowly resumed when the eyes were kept shut. Fine nystagmus was observable when the eyeballs were deviated to the right. The left auditory meatus contained pus and a mass of granulations which filled the inner part of the canal.

Hearing tests: The low tone limit was raised on both sides, particularly on the left (suppurating) side. The high tones were heard well on both sides, though with appreciable loss on the left side, for air-borne tones. Weber's tests were definitely referred to the left side.

Rotation tests: *Head erect*: Rotation anti-clockwise produced well-marked horizontal nystagmus to the right, which masked the spontaneous rotatory nystagmus for about 30 seconds; rotation clockwise produced feeble horizontal nystagmus to the left lasting about 10 seconds.

The inferences drawn from the rotation tests were that the right labyrinth reacted normally, and that the three left semicircular canals were all defunct. The history and signs pointed to a recent invasion of the left labyrinth, although the hearing tests excluded complete disorganisation.

September 13: Radical mastoid operation and double vestibulotomy. The mastoid was non-cellular. Pus granulations and cholesteatomatous debris were contained in the antrum and tympanum. The larger ossicles and tympanic membrane had disappeared, and there was a large fistulous opening into the external semicircular canal. The stapes could not be recognised by inspection, but resistance in the region of the oval window was felt with the fine exploring probe. There was no pus in the semi-

circular canal, the contents of which were deeply blood-stained. The vestibule was then opened both above and below the facial nerve and the cochlea removed. As the base of the modiolus was chipped off about a cubic centimetre of cerebro-spinal fluid escaped. A skin-graft prepared by the acetone and iodine method was introduced after the meatal flap had been reflected, and the cavity was packed. The next day the patient felt more comfortable. There was no flow of cerebro-spinal fluid.

September 15: During the afternoon the headache returned and the patient complained of stiffness in the muscles of the back of the neck. The temperature now began to rise, eventually reaching 102° F.

September 16: This morning the patient now held the head strongly retracted. It could not be flexed forwards. The pain was chiefly in the occipital region. Lumbar puncture drew off a turbid fluid under considerable pressure. This fluid was reported to contain 3500 polymorphonuclear leucocytes per c.mm. No organism could be found in the films at the time, nor in culture media. It was possible to obtain a clear view of the inner labyrinthine wall through the external meatus, so the patient was given a few whiffs of chloroform and a small gouge was introduced into the external meatus. Two taps with the hammer sufficed to penetrate the internal auditory meatus, and immediately a considerable quantity of turbid cerebro-spinal fluid was released. This continued to flow for about fourteen hours. During the evening a second lumbar puncture was made; the fluid still appeared turbid and escaped under pressure.

September 17: During the night the headache and rigidity of the neck steadily diminished and the temperature gradually fell from 102° to 98° F.

September 18: The meningeal symptoms completely disappeared, and from this time onwards the progress towards recovery has not been interrupted. At the present time the cavity presents the usual appearances after a radical mastoid operation, healing partly by primary skin-graft and partly by granulation.

A similar case to the foregoing was described jointly by Mr. C. E. West and myself in 1908.¹ The rationale of the procedure had been recognised from a study of a series of cases which I observed during 1907-1908,² and the operation in the present case was the same as that which we have also described elsewhere under the title "Translabyrinthine Drainage of the Basal Meninges."

The PRESIDENT said the only point which occurred to him was as to whether the application of the graft had anything to do with the inefficiency of the drainage.

Mr. C. E. WEST said in regard to skin-grafting when there was any fistulous opening in the labyrinth, that, though he skin-grafted all routine mastoid cases, he had given up skin-grafting in such cases as had had vertigo, even those in which he failed to find a fistula at the time of operating. On two occasions he had had fatalities which he had directly ascribed to the skin-grafting. In one case the graft was put over a dark spot on the canal, as he believed penetration had not occurred, and the patient had labyrinthitis, meningitis, and died. In the other case he grafted only the posterior part of the cavity, and yet the patient died.

Mr. MARRIAGE had grafted a number of pure bony cases where there had been a fistula. The other class of cases he did not graft, but left them open for free drainage.

¹ See *Proceedings*, ii (Otol. Sect.).

² See *Proceedings*, 1908, i (July), (Otol. Sect.).

Mr. O'MALLEY said that cases of this type raised two points of great importance: (1) What symptoms and signs of labyrinthine disease, associated with chronic otorrhœa, justified vestibulotomy? (2) What were the risks of vestibulotomy under these conditions? His actual experience of labyrinthine sepsis was limited to eight cases of various degrees of severity, and he had been guided in their treatment by the teaching of Neumann and Bárány. Neumann divided labyrinthine cases into two types: (1) Suppurative and destructive or irreparable; (2) inflammatory or reparable. If the hearing was good, even when tests showed no response from the vestibular apparatus, he regarded the case as probably inflammatory and reparable and preferred to wait and watch. Bárány opened the labyrinth after doing the radical mastoid operation, in cases showing a large spontaneous nystagmus, with no caloric response, and with pronounced or absolute deafness, but he did not do so in cases of circumscribed labyrinthitis with good or even moderately good hearing, unless the vertigo or vomiting were severe, as fistulæ would heal. The risks of vestibulotomy were summed up in one word—meningitis. In the experience of the Vienna school the risk of meningitis following vestibulotomy as a result of the operation alone was not more than 1 or 2 per cent. The question of skin-grafting in a case of this kind required serious consideration. Personally, he was not in favour of it. The more efficient the skin-graft the more effectively would it lock up any sepsis which might be unavoidably introduced when operating in the presence of active middle-ear suppuration. The preservation of hearing was not a factor here, so that rapid healing, with a minimum of scar-tissue, was unimportant when compared with the need to maintain free drainage from a septic focus in such a danger zone.

Dr. DAN MCKENZIE said a case he lately had had illustrated the progress of events in this case, with one exception—namely, that in Mr. Scott's case the patient recovered. In the case on which he (Dr. McKenzie) had operated there were evidences of disease in the labyrinth. Prior to operation there were no signs of meningeal trouble, and yet within forty-eight hours after the operation on the labyrinth the woman developed acute meningitis, which, in spite of prompt and very free drainage, proved fatal. The question which forced itself upon his mind was, was he justified in having opened the labyrinth? And that question also applied to Mr. Scott in this case. What were the indications upon which the surgeon should base his operative interference in labyrinth disease? He thought that in suppuration of the ear, unless the labyrinth was obviously destroyed as a whole, both hearing and vestibular reactions being abolished, one should be content with the simple radical mastoid operation. Cases had been shown again and again in which fistulæ had healed and the labyrinth irritation had passed off after the simple operation. In the light of his own case, and of the present one, he would be very cautious as to opening a labyrinth. He would not, in future, open a labyrinth unless the tests showed an absence both of audition and of the vestibular reactions in the affected ear; or, secondly, unless the antecedent presence of meningitis rendered drainage through the internal auditory meatus and labyrinth an imperative necessity, regardless of the condition of the internal ear itself.

Trichophyton Granuloma affecting the Auricle and other Parts of the Body.—Hunter Tod.—Patient, a male, aged twenty-one, in 1906 suffered from tinea of abdominal region. Cured by treatment. It then affected the left ear, and a large mushroom-like growth of the auricle

and mastoid region gradually formed. Applications of X rays caused disappearance of the growth within six months, leaving only the stump of the auricle. A year ago there was some middle-ear suppuration, which has recurred off and on. The present condition of the auricle has been stationary for over a year. There is still active disease of the left axilla and thoracic region, which is improving under carbolic acid injections and X rays.

Mr. Tod added that the case was unique, being the only one of its kind recorded in this country. Dr. Sequeira, under whose care the patient was, had already published a full description of it, with photographs.¹ There was no evidence that the middle-ear suppuration which now existed was due to the same infection, but rather to an ordinary suppurative lesion. A sister of the patient had been similarly affected previous to her brother. The infection was supposed to have come over from Denmark, where trichophyton infection was said to be fairly common.

Malignant Disease of the Ear; ? Epithelioma becoming Sarcoma.—G. J. Jenkins and G. F. Stebbing.—Male, aged forty-eight. He had ear-ache at fourteen years of age: so far as he knows he has never had any discharge from either ear until just recently. Some time last summer (1912) he noticed a small swelling on the left side of the neck just below the angle of the jaw. At a hospital an operation was performed for the "removal of glands of the neck" in September, 1912. He first noticed a discharge from the left ear in November, 1912, and about the same time he noticed further swelling in the neck and felt the polypus protruding from the meatus. Left facial paralysis was first noticed about the end of January. Later he had difficulty in swallowing, and regurgitation of fluids took place through the nose. Patient is emaciated. The whole of the left pinna is pushed outwards and there is some brawny swelling and oedema over the mastoid process. Protruding from the meatus and distending the canal is a polypus about the size of a walnut, which bleeds slightly. There is foul discharge from the ear. Below the ear there is a subcutaneous mass spreading backwards as far as the posterior border of the sternomastoid. This mass, involving not only glands, extends almost to the middle line in the region of the larynx, where a sharp border can be felt. Enlarged glands can be felt in the neck as low as the clavicle. Paresis of the left external rectus, recent. The tongue is protruded to the left. Nothing abnormal noted in the nasopharynx. Paralysis of the left half of the palate and adductor paralysis of the cords. Defective movement and wasting of the left trapezius. Marked deafness in the left ear. Weber—to the left. Rinne negative in left ear.

There was severe pain in last few weeks of life. Patient died on April 1, 1913.

Post-mortem showed that the mass in the neck had caught up the hypoglossal, external laryngeal and spinal portion of spinal accessory. The recurrent laryngeal, vagus and sympathetic escaped. The walls of the external auditory meatus were involved, anteriorly and posteriorly. The facial nerve passed through the tumour. The middle ear was filled with tumour which is just showing in the middle fossa in that region. It also seemed to extend forwards along the Eustachian tube. The floor of the middle ear has been destroyed by the growth.

¹ *Brit. Journ. Derm.*, 1906, xviii; see also *Proceedings*, 1912, v, pp. 33 and 84.

Mr. JENKINS added that, microscopically, it was a mesoblastic tumour, a sarcoma. At first it was regarded as epithelioma, but its fungating feature was against that view. Specimens were exhibited for examination by members, and he would be glad of their opinions.

Mr. MARRIAGE saw the case last December, and took a piece for microscopical examination. The report of that examination was that it was carcinoma. The same view was expressed about the glands which were removed in September. He had not seen the specimens himself, but had looked up the note of the pathologist.

Dr. GRAY thought there was nothing inconsistent in both views being correct. Carcinoma transplanted into mice occasionally aroused a sarcomatous reaction in the tissues; and he had known a clinical case in which epithelioma of the lip formed a secondary epitheliomatous deposit in the leg, which subsequently became sarcomatous. In view of our comparative ignorance, and remembering the knowledge which had lately been acquired, it was conceivable that a growth which was at first carcinomatous should, some months later, become a sarcoma. The connective tissue elements sometimes reacted in such a way that the epithelial cells were overpowered, and in that process the connective tissue cells acquired a malignancy of their own. He had not heard of the process being reversed—namely, sarcoma causing carcinoma. He had heard of cases in which the same pathologist reported a case to be carcinoma at one examination and sarcoma at another.

Mr. JENKINS, in reply, said he thought the specimen which he had exhibited could not be epithelioma, though there was room for discussion as to whether it was endothelioma or sarcoma. The two expert opinions he had had were both in favour of the tumour being mesoblastic.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

June 6, 1913.

MR. HERBERT TILLEY, *President, in the Chair.*

Scars of Operation on the Frontal Sinus obliterated by Time.—Herbert Tilley.—Female, aged sixty, was operated on thirteen years ago for chronic empyema of both frontal sinuses. The usual incision through each eyebrow was made—a vertical incision in the lower half of the mid-frontal region—and these were joined by transverse incisions across the root of the nose, which joined the lower end of median with the inner end of the latter incisions. It was thus possible to turn upwards and outwards on each side a triangular flap which fully exposed the anterior wall of each frontal sinus. The nasal cavities are free from suppuration and the internal surface of one sphenoidal sinus is easily seen.

Adult Male with (?) Early Malignant Disease of Lower Pharynx and Upper End of Gullet.—Herbert Tilley.—Male, aged fifty-three, complained of difficulty in swallowing solids and loss of flesh, but no pain

on swallowing. He says he had a large lump on the left side of the neck which "had been dispersed."

Laryngoscopic examination reveals a small raised, flat swelling with free edges behind and just above the left arytænoid. Its surface is slightly paler than the surrounding mucosa and is not ulcerated. The growth on the postero-lateral pharyngeal wall bleeds freely on being touched. There is a small, hard, easily movable gland behind the upper end of the left sterno-mastoid. Further, in the left base of the tongue is a smooth, circumscribed slightly raised nodule about the size of an ordinary filbert.

Mr. HARMER thought it would turn out to be malignant. He asked whether pieces of growth had been removed from the upper part of the œsophagus and from the tongue; also whether glands had been removed from the neck, because possibly the patient had more than one malignant growth, and, if so, cure by operation was hardly possible.

Dr. W. HILL said operation would have to be a formidable one, because the larynx and base of the tongue would also have to be removed. Mr. Evans once showed at the Section a case in which he did a very extensive removal, including about one third of the œsophagus, glands, the base of the tongue, pharynx and larynx. The patient not only recovered, but afterwards married. Food was conducted from a hole in the side of the pharynx by a rubber tube down to a gastrostomy opening.

The PRESIDENT replied that a portion of the ulcer would be removed before any radical operation, which had not yet been definitely decided on.

Symmetrical Swellings on Anterior Aspect of Arytænoids just above the Vocal Processes.—Herbert Tilley. — Male, aged thirty, complained that his throat gets dry after using his voice for a few minutes. No other symptoms.

On the anterior and median aspect of each arytænoid and above the level of the vocal process a small, pale, raised prominence can be seen. These come into contact on phonation, but do not interfere with the free movement of the arytænoids, and the voice is not affected. The patient has had syphilis and been treated for the disease, but without any effect on the above appearances, which may be of the nature of pachydermia. Possibly the symptoms have nothing to do with the laryngeal appearances. The patient complained of thirst, but there was no sugar in the urine, and no kidney disease was present.

Dr. H. J. DAVIS said the condition at first sight suggested papillomata, but on careful inspection the growths seemed to be hard; on the left side was a cup-shaped depression into which the elevation on the opposite side fitted. He believed it to be pachydermia, and advised leaving it alone.

Sir STCLAIR THOMSON agreed with the diagnosis of syphilitic pachydermia. He was once deceived by a case somewhat similar, which turned out to be tubercle, but in it there was some abrasion or ulceration of one of the swellings. If he were the patient he would not have them operated on, but a scientific enthusiast might wish to remove a portion and examine it under the microscope.

Dr. JOBSON HORNE also considered that the excrescences might be of the nature of pachydermia laryngis and that syphilis was a causative factor. He would be in favour of reducing the excrescences and of insisting upon absolute silence during treatment. The man's occupation permitted of this. The throat symptoms complained of could be accounted for by the nasal obstruction of which he complained, and

attention to the latter would doubtless be beneficial both to the throat and to the larynx.

Dr. DONELAN said that viewed externally, in the absence of a speculum, the appearance of the nose suggested a deviated septum. The patient said that one of the reasons his throat was so dry was that he had much difficulty in breathing through his nose. Dr. Donelan would be glad to know how far this might be correct.

The PRESIDENT replied that the question of nasal obstruction was gone into, and it was concluded that there was not enough to indicate that it was a probable factor in the laryngeal condition.

Osteoma of the Nose.—H. Lambert Lack.—Woman, aged thirty-one, shown at the Laryngological Society in 1904. She had a large growth in the left nostril, completely distending it, pressing the septum over to the right side, and occluding the ostium of the left antrum. The growth was removed by curetting, and she has remained well until the last three months or so. Now there are signs of a return of the growth in the position of the left inferior turbinate and on the outer wall of the nose above the turbinate. During the last three months she has had some neuralgia on the left side of the face and some swelling of the left cheek. The left antrum is completely dark on transillumination. There is no discharge from the nose. The case is a rare one, and any suggestions for treatment would be welcome.

Dr. JOHNSON HORNE said the pathology of these cases had not been worked out. The disease, according to his own observations, was usually bilateral. Speaking generally, he thought the lesions were due to an infective process.

Dr. KELSON some years ago had shown a case resembling the present one, and they seemed to be allied in some respects to cases which occurred on the West Coast of Africa. The bone must have been quite soft, as Mr Lack spoke of removing it with a curette. In his own case, though the bone appeared to be hard, it crumbled up when touched with a sharp instrument. The section showed simply thin bone, and there appeared to be no growth.

Dr. BOND said the history seemed to point to a growth beginning on the inner wall of the antrum, and if the antrum were opened up, either by cutting alongside the nose and through the upper lip, or lifting up the nose and cheek, one could see what should be done. He thought it would be necessary to make a cut to the internal angle of the orbit. Possibly the whole upper jaw would have to be removed.

Mr. E. D. DAVIS said there had been eight cases of hyperostosis cranii shown in which there was enlargement of other bones, including the maxilla, the nasal processes, both sides of the nose, the temporal bone, mastoid, and exostosis of the ear. Dr. Lack's case appeared to be localised to the nose, and was not hyperostosis cranii.

Sir STCLAIR THOMSON said it had been suggested that the upper jaw should be removed, but if a radical operation were contemplated, why remove the upper jaw? It would mean removal of the alveolar border, and result in disfigurement, and it did not bring the operator very near the site of disease. He asked that Moure's operation (lateral rhinotomy) should be considered. He had introduced it to one or two general surgeons, one of whom, Mr. Burghard, said he did not think he would ever again remove the upper jaw. By entering below the eye and cutting through the ascending process of the superior maxilla, there

was free access to the antrum, nose and sphenoid without disfigurement of the patient. It also preserved the teeth, and there was not much bleeding caused.

Mr. LACK, in reply, said his idea was to turn up the upper lip and reach the outer wall of the nose in that way, as it was the lower part of the nose which was affected.

Fatal Cavernous Sinus Thrombosis following Left Tonsillitis.

—H. J. DAVIS.—The patient, a healthy boy, aged ten, developed on December 27 a unilateral parenchymatous tonsillitis. His two brothers had previously been laid up in the same house with follicular tonsillitis. This had run its usual course. On January 3 the temperature was 104° F., with rigors, and these continued in spite of all treatment until he died on January 13, the temperature being 107° F. January 5: Anti-streptococcus serum was injected, and the next day the palate and tonsil were incised and on January 7 incision was made in the neck, but no pus was found. January 8: Swab taken from the wound and blood taken from elbow vein; swab was sterile, but after prolonged cultivation *Staphylococcus albus* was found in the blood. On January 9 the diagnosis of cavernous sinus thrombosis was obvious. The eyelids were cedematous and tightly closed over the eye, which was bulging, there was ecchymosis of the conjunctiva, and oedema had spread to the forehead and face from blocking of the facial vein and extended down the neck. There was little to be seen in the throat except that the left tonsil was red and slightly enlarged. Incisions were made in the palate, face, neck and eyelids, and the conjunctiva was also incised and 5 minims of liq. ammon. fort. administered every two hours in water. January 10: Twitchings and paresis of the leg supervened; lumbar puncture fluid clear: 4 c.c. drawn off apparently not under pressure. Fluid sterile and did not reduce Fehling's solution. Child died on January 13.

In the only other two cases of cavernous sinus thrombosis following tonsillitis which he had seen, in one the patient recovered, but was blind, and the other, a soldier, died on the fifth day. In each case the affection was unilateral.

Mr. O'MALLEY asked the route of spread of the infection from the tonsil to the cavernous sinus. He knew of a case in which the cavernous sinus became involved three weeks after the removal of tonsils and adenoids. The patient died and the *post-mortem* showed the tonsillar and adenoid regions fully healed, and the presence of an osteomyelitis of the body of the sphenoid, which involved the sinus by direct spread along the optic nerve on one side. In the present case there might have been another focus of infection besides the tonsil, which would account for rigors and high temperature, even before invasion of the sinus.

Sir STCLAIR THOMSON said he had seen only three cases of thrombosis of the cavernous sinus. In two the spread was from the sphenoid, and the third was an ear case. It was difficult to trace the route from the tonsil. The histories seemed to suggest that the same infection which attacked the tonsil got located in the sphenoidal sinus, and that even in so-called tonsil cases the thrombosis was really of sphenoidal origin.

Dr. JOHNSON HORNE recalled a case in which there was no external indication of infection, but *post-mortem* the sphenoidal sinus was found to be infected, and that fully explained the condition.

Dr. W. HILL asked what line of surgical treatment should be adopted in cases of cavernous sinus disease if one were asked to do something more when vaccines failed. The sinus was awkwardly situated, but it

could be got at either through the skull or through the orbit or through the sphenoidal sinus. He wondered whether it had been found useful to turn out the clot and drain.

Dr. FITZGERALD said that thromboses of the pterygoid plexus of veins are usually responsible for cavernous sinus thrombosis in infection from throat. He believed the sinus had in some cases been approached through the pterygo-maxillary fossa.

Dr. DAN MCKENZIE said the question of operation would be found dealt with in a recent number of the *Lancet* in an article by Mr. Ballance, in a paper read by him at the International Congress of Otology, Boston, last year.

Mr. H. J. DAVIS believed the infection of the cavernous sinus travelled through the facial vein, as it communicated by the angular vein with the ophthalmic vein in the orbit. The œdema of the face was due to plugging of the facial vein. He did not know whether there was trouble in the sphenoidal sinus, but there was nothing to suggest it. Strong ammonia certainly reduced the liability of the infection to spread; that was seen also in jugular sinus thrombosis in which the jugular was not tied, and in femoral thrombosis and thrombosis elsewhere in the body. It lessened the tendency to coagulation.

Unilateral Paralysis of Left Cord, Tongue and Palate.—H. J. Davis.—The patient, a healthy-looking man, aged forty-nine, had a history of three weeks' increasing difficulty in swallowing, and the case was supposed to be one of early œsophageal growth. The left side of the tongue was atrophied and paralysed; the same applies to the palate and the same to the left side of the larynx. The dysphagia is probably, therefore, due to muscular weakness. Probably the implication of the cranial nerves is due to a specific meningitis.

The PRESIDENT some years ago had shown two cases: (1) A patient suffering from syringomyelia in which there was paralysis of the right vocal cord, of the right half of palate and pharynx, the right sterno-mastoid and upper third of trapezius. (2) A male, with paralysis of left vocal cord, left sterno-mastoid and upper third of trapezius. This was probably due to a basal pachymeningitis. Similar cases had been previously recorded by Hughlings Jackson and Morell Mackenzie.

Perforating Ulcer of the Palate.—W. H. Kelson.—Patient (a clerk), aged sixty-three, who denies syphilis, says he first noticed a small sore on the roof of his mouth eighteen months ago. Six months ago he went into hospital and had three doses of neo-salvarsan, 2.4 grm. in all, and on leaving the Wassermann test was negative. He then gave up treatment for some months. The ulceration, however, still went on, and he became much troubled with food passing up into his nose. He then became a patient at the London Throat Hospital, and is now taking perchloride of mercury and iodide of potassium. A large funnel-shaped ulcer of the hard palate is present, which passes up into the cavity of the nose.

The PRESIDENT said that two or three years ago there was a similar case at University Hospital. The man was medically treated with anti-syphilitic remedies, as well as calomel inhalations. The Wassermann test, however, was always negative; and yet the appearance was so much like that of syphilis that the treatment mentioned was continued. The patient died, and the disease was proved to have been chronic glanders.

In this case the whole soft palate was eaten away so that one looked up into a dome in the nasopharynx.

Dr. JOBSON HORNE said the localised nature of the growth and its duration were against it being glanders. The appearance of the ulceration was unusual in that situation and reminded one of so-called "rodent ulcer." However, the enlarged and hard lymphatic gland beneath the angle of the jaw on the right side suggested malignancy.

Lupus of the Gums and Pharynx.—W. H. Kelson.—Patient, a man, aged forty, who denies syphilis, states that his throat first felt sore about seven months ago, but says he now has no pain on swallowing. On examination ulceration and a nodular condition is seen on the gums, right tonsils, palate and pharyngeal wall. Marked improvement has taken place since he has been put on arsenic, and incidentally a very irritating skin eruption from which he had suffered for several years has disappeared.

The PRESIDENT noted that the gums were most diseased where the pyorrhœa was most marked. The teeth certainly needed attention.

Dr. JOBSON HORNE had detected a similar lesion in the inter-arytænoid region of the larynx of the patient.

Dr. KELSON replied that the patient could now swallow in comfort, whereas previously he had been in considerable pain. He believed it was lupus.

Laryngeal Disease.—W. Jobson Horne.—The patient, a male, aged thirty-six. The left vocal cord was hidden by the left ventricular band. The movement of the cords had been irregular: the left appeared to move with a greater effort than the right cord. The nature of the laryngeal lesion was doubtful.

A sister had died from consumption. The examination of the thorax and the sputum was negative.

Sir STCLAIR THOMSON said he looked carefully for the atypical feature, but he could not see it. He saw one ventricular band more prominent and slightly overlapping one vocal cord, but he did not regard that as more than a physiological abnormality.

The PRESIDENT said that the day before he was consulted about a similar case. The patient had been speaking in public a good deal, and his physician saw the left ventricular band rather overlapping the corresponding cord. He (the speaker) gave the opinion that the appearances were within normal physiological limits.

Dr. JOBSON HORNE did not consider that the appearances which the larynx presented should be passed over as being within the normal physiological limits.

Double Paralysis of the Superior Laryngeal Nerves in the Course of Disseminated Sclerosis from Lead Poisoning.—James Donelan.—This man, aged twenty-five, was first seen on June 19, 1912. He gave a history of pleurisy at the end of the previous October, since when he had been losing weight. He had a husky voice and a small, white lenticular swelling, about 3 mm. in diameter, at the junction of the right vocal cord and vocal process. He had some soft *riles* over both upper lobes. The case was regarded as probably one of tuberculosis. He went to a sanatorium on September 14, remaining there until November 9, when it was decided that the case was not one of tuberculosis. The patient on January 8 was seen by Dr. Head, who regarded the case as

disseminated sclerosis. On March 5 it was found that both crico-thyroid muscles were paralysed, but there was no paralysis of the recurrents. Abduction and adduction are unimpaired, and the patient possesses a loud, rough voice, being able to shout, but the tone and ring of the normal voice are absent. The wavy outline of the glottis is very characteristic. There appears to be some slackness of the arytaeno-epiglottidean folds. There is scarcely any movement of the cricoid cartilage towards the thyroid during phonation.

He was a printer's labourer, occasionally employed on small jobs of type-setting, such as the titles of books. He had also a good deal to do with the handling, cleaning and forwarding of frames of type. His attack of pleurisy in 1911 seems to have diminished his resistance to lead-poisoning.

Tonsil Forceps.—**James Donelan.**—This instrument is on the principle of the Krause wool-holder and permits the passage of any snare or tonsillotome after the grasp has been secured. It is made to grasp the tonsil in a vertical direction as suggested by Ballenger some years ago. Instead of teeth, which are so often apt to tear the tonsil, it has two grooved rings like a tongue forceps. It has proved useful in the removal of stumps and embedded tonsils.

Sinusitis Exulcerans of the Frontal Sinus; operative Trauma of the Dura; Recovery.—**Dan McKenzie.**—The patient, a female, aged sixty-six, was seen in August, 1912, on account of a small, painless swelling under the left supra-orbital margin of a few days' duration. There was no history of any discharge from the nose, and no pus could be seen in any part of the nasal cavities. Nevertheless, the swelling, which had now spread to involve the whole supra-orbital region and upper eyelid, was obviously due to frontal sinus suppuration.

The first operation was to have been limited to simple opening and drainage of the sinus. But early in the proceeding the dura was wounded in a curious manner. After making the first incision through the eyebrow down to the periosteum, whereby a quantity of pus was evacuated, in elevating the pericranium the end of the elevator plunged through the soft anterior wall of the sinus, and through a sinus full of pus, through its posterior wall, which was thin but healthy, and through the dura!

After removing all the walls of the sinus (save the posterior) the fractured posterior wall lay exposed to view. This wall was removed with cutting bone-forceps and a tear in the dura revealed about 3 mm. in length. The dural tear was then enlarged until the cerebro-spinal fluid began to flow freely. Finally, a gauze drain was inserted between the lips of the dural wound, and the sinus, etc., was lightly packed with iodoform gauze.

Save for a violent headache next day the patient showed no sign of intra-cranial damage, and fears of trouble from the accident soon subsided. After a prolonged course the sinus finally healed. The deformity is great, but so was the bony destruction.

Attention was drawn again to the accident to the dura (and doubtless to the brain), and to the advisability of exposing and enlarging such wounds so as to institute a free flow of cerebro-spinal fluid.

The PRESIDENT had lately seen a similar case, in which there was an acute exacerbation of chronic frontal sinus empyema. He made the usual incision through the eyebrow, and inserted an elevator to raise the

periosteum from the front wall of the sinus, but the bone composing that wall was so soft and infiltrated by inflammatory products that it broke away with the periosteum, and thus the sinus cavity was at once exposed in its whole anterior extent. The patient had recovered. The posterior wall of the sinus was healthy.

Mr. H. J. DAVIS said he did not see the object of always removing the floor of the sinus. The best way of making an infundibulum larger was with a drill, and he did not think such a cavity ever closed up. It left a hole large enough for the house-surgeon to pass in a catheter and wash it out. Patients got well without the floor of the sinus being removed, and there was less risk of injury to the eye.

Major MOORE said the patient had made an excellent recovery from her very serious illness. It would seem a pity that so large a degree of deformity should remain. Did Dr. McKENZIE at a later date propose, by paraffin injection or other means, to lessen this?

Dr. McKENZIE replied that the patient was aged sixty-six, and he had no intention of operating any further.

Death after Tonsillotomy.—**Dan McKenzie.**—The patient, a boy aged nine, was brought to the Central London Throat and Ear Hospital on March 6, 1913, for the removal of enlarged tonsils and adenoids. The presence of subacute middle-ear catarrh, with some fever (temperature 101° F.), led to the postponement of the operation on the throat for five weeks. At the end of that time the ear was dry and he was considered to be sufficiently well. Tonsils and adenoids were, therefore, removed in the out-patient department under ethyl chloride anæsthesia on April 16, 1913, the simple tonsillotomy operation being performed.

Three days after operation he returned to hospital with a temperature of 103° F.; great œdema and swelling of the left side of the neck below the left angle of the jaw, together with redness, swelling, and a sloughy condition of the left side of the palate and pharynx. An incision was at once made under chloroform into the œdematous cervical swelling, and a great quantity of fœtid pus delivered. Next day the boy looked better. The cervical œdema had disappeared, the faucial inflammation had subsided, and the patient could phonate, swallow and breathe without difficulty. The temperature was lower, oscillating between 99·2 and 102° F. On the following morning, however, he was suddenly seized with violent pain in the left side of the chest, the respirations rose to 30 in the minute, friction could be heard, and his strength began to fail. Eighteen hours later he died. *Post-mortem*: Double pneumonia and pleurisy, with double empyema; pericarditis and pericardial effusion. The organisms obtained both from the cervical abscess and from the pleural cavity were of the same type as those which normally inhabit the mouth and pharynx—*Spirochaeta dentium*, etc. The patient's teeth were all sound. The death was ascribed to oral sepsis.

Dr. JOBSON HORNE considered that the presence of the *Spirochaeta dentium* was a coincidence and not the cause of the death. The latter he considered was probably a pneumococcus infection and associated with the middle-ear disease.

Dr. DONELAN agreed that death was probably due to pneumococcal infection.

Mr. H. J. DAVIS said that two years ago an out-patient, aged seven, died after such an operation eight days afterwards, of septic pneumonia, and with enlarged glands on each side of the neck. It was not unusual for out-patient operation cases to be laid up with bronchitis, and the condi-

tion of the throat became septic if they did not receive careful subsequent attention at home. His practice was to order them to be kept three days in bed and another three days indoors.

Dr. McKENZIE stood by his contention that the infection from the mouth was the probable cause of the death.

Goitre with Severe Pressure Symptoms; (?) Malignant.—Dan McKenzie.—The patient is a woman, aged seventy-three. The goitre has appeared within the last three years. It is nodular and rather hard. There is tracheal stridor and some difficulty in swallowing. The left cord is paralysed; the trachea can be seen to be narrowed; the external jugular vein is greatly enlarged; and there are some enlarged glands in the left supra-clavicular region.

Mr. HARMER did not think it malignant. The difficulty of breathing and swallowing might be caused by the fact that it travelled down into the thorax behind the sternum, and if she were well enough he would take out a piece of the growth and ascertain its nature.

The PRESIDENT said he had seen a patient who had paralysis of the left recurrent nerve, with difficulty in swallowing; the case was transferred to Mr. Berry, who operated upon her, and removed a large dermoid cyst from behind the manubrium sterni. In the patient shown to-day the thyroid was rather soft, whereas the malignant tumours of this gland which he had seen had usually been extremely hard.

Dr. McKENZIE replied that some years ago he had a case of what appeared to be a goitre, which was pulsating, and hamorrhage was expected; but it turned out to be a mediastinal dermoid presenting in the neck. It did not permit of removal, and a sinus was left open in the neck, discharging dermoid material.

Endothelioma of the Soft Palate.—Dan McKenzie.—Girl, aged seventeen. The growth appeared in the nasopharynx in clusters of polypoid-looking masses. Three operations have been performed. In the last, a fortnight ago, the external carotid was tied, and the soft palate removed. But it was found impossible to remove the whole of the growth as it had extended to involve the lateral wall of the nasopharynx.

The PRESIDENT said he had seen seven such cases early, when there was only a little deafness or a little anaesthesia over the lower division of the fifth, and a little immobility of the levator palate. Extensive and complete operations on some of his cases had been done, but no case had been cured.

Mr. H. J. DAVIS said treatment by diathermy might be used.

Mr. HARMER said ten cases of malignant growth of the palate had been treated at St. Bartholomew's Hospital by diathermy. One was still well, eighteen months afterwards, and had been exhibited. There was not much difficulty in the operation, and not much soreness afterwards.

Mr. W. HILL had seen two bad cases in which the tumour temporarily disappeared when treated with radium. In one case the tumour was so large that the palate was pushed forward nearly to the teeth, and the patient could neither hear, swallow nor breathe. Five tubes totalling 250 mgr. were used for about forty hours, and the whole soft mass disappeared, though the invasion of the bone in the region of the pterygoid process remained, as evidenced by ulceration and some pain. Hearing became normal in one ear, and greatly improved in the other; swallowing

became normal; the patient was able to dispense with his tracheotomy tube at the end of a week. The patient lived six months, but there was eventually marked involvement of the maxilla, etc.

Mr. KISCH suggested that Coley's fluid might be tried.

Dr. MCKENZIE replied that he did not think any of the remedies suggested would make much difference in this case, because when he tied the external carotid he had removed some glands which were found to contain growth. The patient came complaining simply of nasal obstruction, and he saw what looked like polypi in the naso-pharynx. On putting his finger in he found they sprang from the upper surface of the soft palate. The pathologist reported at first that they were simple nasal polypi, but further investigation revealed their true nature.

Large Polyp growing from the Tonsil.—E. D. Davis.—The patient, a man aged twenty-one, said that he could see something growing from his tonsil, but there were no symptoms. The pedicle of the polyp was crushed with artery forceps and the polyp cut off.

The PRESIDENT said these growths nearly always grew from the region of the intratonsillar fossa.

Web in the Nasopharynx.—J. H. Connolly.—Patient, a woman, aged thirty-two, under treatment for suppurative otitis media believed to have begun about three years ago. No complaint directly referable to nasopharynx now. Passing upwards and backwards from Eustachian cushion on either side and meeting across vault of nasopharynx is a fringe of mucous membrane, which might be compared to the peripheral remains of a diaphragm. It presents two small perforations, one on either side. There is a distinct interval between posterior edge of septum nasi and the fringe.

Dr. JOBSON HORNE said that when the condition was unilateral the question of traumatism had been raised.

Mr. H. J. DAVIS considered it was scar-tissue from a gumma in the post-nasal space.

Mr. CONOLLY expressed the opinion that the structure was congenital in origin.

Malignant Disease of the Œsophagus; complete Paralysis of the Left Recurrent Nerve.—E. A. Peters.—H. W. F.—, aged forty-three, carpenter, had severe influenza eight weeks ago. Twenty days ago the voice suddenly became hoarse. For eight days there has been inability to swallow solid food. The left cord is completely paralysed: it is curved and lies in the cadaveric position. The left arytenoid is slightly pushed forward and rotated, so that the vocal process is prominent and gives the sickle-shaped appearance to the cord. A bougie passes only $8\frac{1}{2}$ inches from the teeth, and an enlarged gland can be felt above the left clavicle. Nothing abnormal was found on examining the heart and lungs.

Dr. W. HILL said he had seen a number of malignant cases in which the dysphagia was of quite sudden onset. The revealing signs of cancer of the œsophagus were very late. Sometimes even with considerable stricture the patient could swallow well, and in most instances the disease was quite advanced before anything was suspected of being wrong, especially when the disease was too low to cause laryngeal paralysis. His diagnosis of advanced malignant stricture based on endoscopy had often been received with scepticism in cases where patients were brought for

the relief of a sudden impaction of a large portion of meat or vegetable in the gullet where there had been no previous symptoms whatever of dysphagia.

The PRESIDENT mentioned a case in which the dysphagia seemed determined by a hearty laugh, and next day the patient was found to be unable to swallow solid food. Until this symptom arose he did not think he was in anything but perfect health.

Syphilitic Ulcer of the Pharynx.—**H. A. Kisch.**—Patient has had a sore throat for two months. The glands in the neck have been enlarged about the same time, but both sides are said to have been involved at first. The throat gets better at times, but has never become quite well. A small elongated ulcer is seen on the lateral wall of the pharynx, on the left side just behind the posterior pillar of the fauces. The base and edges are firm to the touch, but not everted or indurated. There is a chain of glands in the left posterior triangle, the upper glands being the larger, and they appear to be inflammatory in nature. A section of the wall of the ulcer simply shows an inflammatory condition. The patient is aged twenty-four, has had two children and no miscarriages. The Wassermann reaction is positive. The ulcer is healing and the glands diminishing in size with antisymphilitic treatment.

Laryngeal Perichondritis with Stenosis.—**William Hill.**—The man was first shown as a case of escharotic stricture of the deep pharynx and gullet after swallowing glacial acetic acid; later as a laryngeal case with impaired abduction, probably due to myopathic injury; and now he showed it as laryngeal stenosis, obviously associated with perichondritis. The latter had come a month ago. Intubation of the gullet had been discontinued for a considerable time previously. The patient was now wearing a tracheotomy tube and taking iodide of potassium. There had not been more than a slight nocturnal elevation of temperature, for a few days at the most, and he did not suspect it as being streptococcal, but it might be latent chronic pneumococcal disease. There were no tubercle bacilli or any other pathogenic organisms found in the discharges, and the Wassermann reaction was negative. As there was evidence of much external thickening of cartilages as well as internal stenosis it was possible that an abscess might appear later and clear up the diagnosis.

Brain with Large Pituitary Tumour in situ.—**William Hill.**—The case was described at the March meeting of the Section.¹ The specimen was now shown mounted on gelatine by the Kaiserling process.

A slice has been removed from the surface of the right half of the tumour to show extravasation of blood into the substance of the tumour from operative perforation. This led to the formation of a large hæmatoma beneath the capsule and caused death by increased intra-cranial pressure.

Tumour of Superior Maxilla.—**Walter Howarth.**—The patient has noticed a swelling of the right side of the face for six months. There has been no discharge from the nose and only bleeding on one occasion three weeks ago. There is no pain. There is no pus in the antrum. On transillumination there is a dark shadow on the right side, whilst the X-ray plate shows the region to be more opaque than the left side. There are no unerupted teeth. An exploratory incision was made in the

¹ See *Proceedings*, p. 103 *et seq.*

labio-gingival fold and the periosteum raised over the swelling. The surface of the tumour was smooth and gradually shaded off into the maxilla, so that it was impossible to say which was tumour and which maxilla. Considerable portions were chiselled away and presented the appearance of rapidly growing bone. Microscopic sections show a condition of chronic osteitis with considerable rarefaction.

? Malignant Ulceration of Hard Palate.—**W. M. Mollison.**—Male, aged seventy-one. He has noticed a small lump under the left side of the tongue for some twelve months; it has slowly increased in size and is painless, though bleeding now and then. There is a hard, movable mass under the tongue on the left side scarcely painful to touch; not ulcerated. The tongue can be well protruded. There is superficial ulceration on the right side of the hard palate extending on to the posterior extremity of the alveolus; the palate is freely movable. There is a single hard gland beneath the angle of the jaw on the right side.

Mr. H. J. DAVIS said epithelioma of the palate often began in this way. One instance was shown at the Section three and a half years ago. Some thought it was herpes and others that it was lupus. He first thought it was lupus, and then tuberculosis, but the patient developed later a fungating mass which was malignant.

The PRESIDENT said Mr. Charters Symonds had drawn attention to the point mentioned by Mr. H. J. Davis.

Dr. KELSON was struck by the resemblance of the case to Mr. Lack's, sections of which proved to be papilloma. He suspected the present case was malignant, but possibly it might be papilloma.

Mr. MOLLISON said that he recently saw a man with a superficial ulcer on his soft palate, creeping into the right tonsillar fossa. There was a strong tubercular history—almost all his relatives had died from it. The ulcer was superficial and movable. He removed the growth, thinking it was a localised tuberculous ulcer; section, however, showed it to be epithelioma. With regard to his case he replied that he took the ulceration on the palate to be syphilitic, and thought the mass under the tongue was a chronic inflammatory condition becoming epitheliomatous.

THE AMERICAN LARYNGOLOGICAL, RHINO-LOGICAL, AND OTOLOGICAL SOCIETY.

May, 1913.

(Continued from vol. *xviii*, p. 605.)

The Surgical Management of Diseases of the Frontal Sinus.
—**Robert Cunningham Myles** (New York City).—The following rules for the surgical management of the diseases of the frontal sinus were proposed:

(1) When the acute cases have unbearable, severe and continuous pain in the sinus and above the eyes, attended with profound constitutional symptoms—fever, chills, and depression—one should proceed in a definite manner to relieve the pressure, if necessary by doing a sub-mucous operation on an obstructive deflected septum and by removal of the anterior end of the middle turbinal, a part of the anterior ethmoidal

cells, and the nasal process of the superior maxillary bone. If this fails, a small incision in the skin above the inner canthus of the eye and a small opening in the bone should be made, a radical operation to follow a few weeks later if necessary.

(2) Chronic cases should be treated by the external operation where there is evidence of bone necrosis, either with or without perforation; for neoplasms, especially of malignant nature; for meningeal symptoms which are probably due to sinus disease; for continued attacks of severe pain and discharge mixed with pus and decaying *debris*, and to satisfy patients who demand relief from recurring attacks of frontal sinusitis after failure to obtain relief by the internal operation.

The Killian operation, combined with the removal of the anterior ethmoidal cells and nasal process of the superior maxillary bone, has proved to be a most satisfactory method in cases of large sinuses. The drain-way into the nose from the space where the sinus has been should be kept open by tubes until the open space under the bridge has become obliterated. Compression over the sinus will aid materially in hastening the healing. The use of the artificial blood-clot, either combined with paraffin or not, will decidedly relieve many of the objectionable deformities.

The Surgical Management of Diseases of the Frontal Sinus.—
Lewis A. Coffin (New York City). Comparatively less extra-nasal operating is being done than at any time since this procedure came into vogue. This is partly because of having reached a better understanding of the disease of the frontal sinus, and of its relation to the diseases of the other sinuses, and partly because of having developed a better intra-nasal technic. There are, however, many cases of frontal and ethmoidal disease which demand extra-nasal attack.

The indications for extra-nasal attack upon the frontal sinus are stated as follows:

(1) Those apparently acute and fulminating cases which present symptoms of extreme pressure together with marked toxicity.

(2) Those cases which, less urgent than the first class, do not recover under intra-nasal treatment.

(3) Those chronic cases in which the membrane has become practically devitalised to the extent of at least being beyond repair.

(4) Children under the age of twelve years. The frontal sinus is seldom much developed at that age, may become diseased, and is best operated extra-nasally.

(5) Any case in which it is known or believed that the bony walls of the sinus are diseased either primarily or secondarily to the disease of the lining membrane.

The straight Killian operation, in the author's opinion, gives the best results in operating extra-nasally upon the frontal sinus.

Dr. H. HOLBROOK CURTIS had said, in 1902, all he had to say on the pathology of this subject. He recalled three cases in which he had operated by the external open method and treated by packing exactly as in the mastoid operation. These were the first cases of the kind presented before the Society. Since that time he had given up much of the external surgery which he then thought necessary. He had, however, done over two hundred intra-nasal frontal sinus operations, and in only two cases had he found it necessary to do an external operation after the internal. He did not allow his patients to progress to the point which necessitated external operation. He did not wish it to be understood that he con-

sidered his operation as originally presented, the object of which was to obliterate the cavity, to be comparable to the operations of Killian or Knapp, which prevented the deformity.

Dr. THOMAS J. HARRIS: This symposium was included in the programme for the reason that it has been a number of years since the subject has been discussed before the Society, perhaps not since Killian was present. Since that time there has been a more or less complete change of view. The speaker did not see a single extra-nasal operation in Germany last year. There must be some reason for this. The point at issue is the treatment of empyema confined to the frontal sinus. Did the members of the Society, as representative American laryngologists, believe that any treatment, other than treatment of the nose, was required for nasal discharge with frontal sinus involvement? Were the failures the result of faulty technique on the part of the operator, or of imperfect drainage? Should every drop of pus be eliminated? There is a large group of cases that are not cured by the intra-nasal method: is it true that this is a matter of personal technique, or is it true that in these cases this method should not be undertaken? The operation is a success as performed by Halle, who, having got the probe into the fronto-nasal duct, always cuts anteriorly, never posteriorly. He uses a silver tube, whereas Ingals uses a gold tube. The position taken by Dr. Haskin with reference to the use of suction in the treatment of frontal sinus disease was deserving of emphasis. The method should be employed not only to relieve symptoms, but with the idea of effecting a cure without going into the sinus at all.

Dr. LEE M. HURD said the indications, as given by the readers of the papers, differ very little from those outlined by Killian and Coakley. Suction is one of the best means for the treatment of both acute and chronic cases. In the local treatment Beck's paste is one of the best measures known to him. It acts even more satisfactorily in the antrum and sphenoid than in the frontal sinus. He has maintained for years that 95 per cent. of cases can be cured through the nose. The remaining 5 per cent. should be promptly opened externally. During the past year he has had three failures from leaving some little cell not drained. He cited a case in which there was involvement of the ethmoidal but not of the frontal sinuses, in which he had operated five times and had used autogenous vaccines, stock vaccines, and phylacogen without success. After prolonged intranasal treatment, osteomyelitis, resulting in death, developed.

Dr. HANAU W. LOEB thought rhinologists had progressed from the period of operative work when the discovery of a single drop of pus was considered an indication for radical surgery, and when a little greyish area on one side of the frontal sinus in an X-ray plate called for radical interference.

Dr. WENDELL C. PHILLIPS emphasised the necessity for the extra-nasal operation in some instances by citing a case in point. He was called in consultation, about a year ago, to see a young man, aged twenty-two, whose family refused to permit operation without further opinion. When he reached the private hospital he found Dr. Coakley and another specialist ready to perform the external operation. The patient had a deflected septum, which almost occluded the nose on the side on which the frontal sinusitis was present. A few weeks previous an operation, supposedly a septal resection, had been performed, resulting in a small perforation but no relief of the deflection. It was impossible to see the middle turbinate. A few days after this operation an infection developed,

which involved all the sinuses on that side. The eye deviated from that side, and other serious symptoms were present. This was a case in which an intra-nasal operation was impossible.

Dr. MYLES, in closing the discussion, thought the external operation had been taken too seriously. If, in certain acute cases under general anæsthesia, a small opening were made, and too much not attempted, the patient would recover in a brief space of time. He had seen cases from different sections of the country, some of whom have had as many as a dozen external operations without being free from discharge. It is important, in doing the intranasal operation, to leave part of the mucosa of the naso-frontal duct, the best results being obtainable when this is done. Care should be taken not to do too much probing during the healing process, as this stimulates the formation of granulation-tissue.

Dr. COFFIN, in closing the discussion, could not understand Dr. Curtis's remarks with reference to having said, in 1902, all that he had to say with reference to the subject. The Killian operation had not been developed at that time. He thought Dr. Curtis considered the Killian operation the method of choice. The speaker believed it to be absolutely wrong surgery not to go in and clean out everything that is necessary, if surgery is to be done. It is the operator's fault when these cases, if seen before serious complications have developed, do not do well. Cases operated upon during the past two years show better results than those operated before that time, which merely shows improvement in technique. He did not wish it to be understood that because he reported cases operated upon by the radical method he advocated this procedure in all cases. In extreme cases he believed in going in and cleaning out thoroughly, according to surgical principles.

Notes on Laryngeal Cases.—Walter F. Chappell (New York City).—Neoplasms, swellings, thickenings and ulcerations in the vicinity of the larynx present so many confusing manifestations that a definite diagnosis can usually be made only after the patient has been under observation for some time. Believing that cases which present difficulties of diagnosis are the most instructive, the author presented the interesting phases of a number of cases which had come under his observation. Of these several were malignant tumours of the cord, in which thyrotomy was performed. A case of "laryngeal snoring" completed the series. The last case concerned a man who for five years had been in the habit of snoring at night, making unusual noises. Three years ago his wife noticed that his breathing would become gradually slow and shallow, continuing so all night, with an occasional snort and blow, which brought temporary relief. After about a year all these symptoms became more exaggerated, the respirations became more laboured and shallow, and the face gradually became blue. After about an hour of this breathing the patient became completely cyanosed, stopped breathing, threw up his hands like a drowning man, and had a general muscular convulsion. When this took place there was a loud violent expulsion of air from the larynx and trachea, and respiration was re-established. The attacks became gradually more severe, until death from suffocation was feared. Examination revealed the fact that the larynx was high in the pharynx, and that the uvula and soft palate were normal in size, but hanging lower than usual. The mucous membrane of the uvula, soft palate and larynx was œdematous and covered with white creases. The trouble was caused by the dropping, during sleep, of the

uvula and soft palate low into the pharynx, being sucked in and out of the larynx until complete occlusion was produced. A violent expiration then expelled the uvula from the larynx, and temporarily re-established respiration. The uvula was, therefore, removed, after which there has been no further trouble. Since encountering this case he had seen several similar, though less severe, cases.

Intra-nasal Treatment of Meckel's Ganglion.—**Edgar M. Holmes** (Boston, Mass.).—The treatment of the sphenopalatine, as well as that of the Gasserian ganglion, is almost always instituted for the relief of severe neuralgic pains. It consists of removing the ganglion by an operation which is necessarily extensive and associated with considerable danger, of injecting some drug into the substance of the gland, or of making application through the nose to the mucous membrane of the area of the ganglion. Two distinct classes of symptoms are considered in the paper: (1) True *tic douloureux*, the distinguishing diagnostic symptom of which is a paroxysmal intense burning, cutting pain, lasting from a few moments to a minute or more; (2) severe acute recurring hemicranias, chronic almost constant hemicranias, facial neuralgias, and deep boring suboccipital pains. From the forty-six cases reported much knowledge as to aetiology and prognosis from treatment was obtained. By the application of a strong solution of cocaine over the area of the sphenopalatine ganglion twelve cases were relieved temporarily, ten were later apparently cured by the alcoholic injection, and of thirty-four cases not relieved by cocaine only eight were cured, and six were more or less relieved by the alcoholic injections. In the majority of the cases there was little or no pain during or after the injection, and therefore there has been as a rule but slight shock following the treatment. One injection may give permanent relief, or may give relief for a short or a long period. A first injection may give relief for a few days, and a second may last for a few weeks, while a third may last for months, and perhaps for years. If no improvement follows after three injections the case may be considered hopeless so far as alcoholic injections are concerned.

In one of his forty-six cases alarming hæmorrhage began on the fifth day following the injection, and coming, so far as he could learn, from or near the area of the injection.

Before injecting Meckel's ganglion the nose and epipharynx should be carefully cleansed, and other surgical precautions for sepsis observed. A fresh sterile $\frac{1}{2}$ per cent. solution of cocaine, a fresh sterile 40 per cent. solution of cocaine, and a Meckel's ganglion syringe filled with a 5 per cent. carbolic alcoholic solution, should be at hand. After cocaineising the lower fossæ of the nose with the weak solution the naso-pharyngoscope should be inserted into the side of the nose opposite the ganglion to be injected, and should be pointed toward the side of that ganglion. The position of the ganglion, which varies somewhat, is approximately under the area just at the end of the middle turbinate, and at this place are almost always two or three small blood-vessels seen emerging from the sphenopalatine fossa. A cotton-tipped applicator soaked in the 40 per cent. cocaine solution is now passed through the same side of the nose as the ganglion to be treated, and when the tip is over the area to be treated the applicator should be held firmly in place. The naso-pharyngoscope can now be removed and the applicator remain in place for five or six minutes. If the pain ceases or is relieved one is probably dealing

with a diseased or excitable ganglion, and in this case the chance of relief or cure is greater than when the cocaine has no effect upon the symptoms. Some cases, however, are not relieved or cured by the alcoholic injection. The author believed, therefore, that one is justified in injecting all cases which are of the type suggesting ganglion disturbance. After a sufficient time has elapsed to thoroughly anaesthetise the area through which the naso-pharyngoscope is to be inserted it should be again passed into the opposite side and the sphenopalatine area brought into view. The Holmes Meckel's ganglion syringe or other suitable syringe should now be passed through the side of the nose corresponding to the ganglion to be treated. The cannula tip, with the needle concealed in it, is directed by the aid of the naso-pharyngoscope until it is in contact with the area into which the needle is to be thrust. It is pointed outward and somewhat upward. The cannula is now firmly held and the needle pushed through it to the desired depth, and the alcoholic solution injected. At the first injection two drops are used, the amount being increased a drop at the time at each subsequent injection.

The series of forty-six cases reported proves that in a certain number of these distressing conditions temporary relief can be given by applying a strong cocaine solution over the area of the sphenopalatine ganglion. In the cases thus relieved marked results may also be expected from the carbolic alcohol injections into the ganglion. Cases not relieved by the cocaine are not hopeless, for a few have been relieved by the alcoholic injections. The procedure is comparatively precise.

Dr. HANAU W. LOEB recalled how often pain was referred from other regions to this region; careful study of other regions from which this pain might originate was therefore necessary. It could not be doubted that sensory nerves may be put out of commission for a longer or shorter period by the injection of alcohol, as may likewise the sphenopalatine ganglion.

Dr. WILLIAM E. SAUER had employed the method described in six cases, with good results in four, and with failure to find the ganglion in the other two. In one case the patient had been free from pain for two years, in one for one year, and in the others for shorter periods of time. In one case he made six attempts to find the ganglion, without success. In one the patient began to vomit immediately afterward, and continued to do so for six hours.

Dr. JOSEPH C. BECK had injected the sphenopalatine ganglion forty or fifty times, with very favourable results. He cited a case in which failure from injecting the sphenopalatine ganglion was complicated by failure to relieve the patient even after removal of the Gasserian ganglion. The man had had all his teeth removed. The supra-orbital and mental nerves were principally involved. His suffering was intense. Morphia had no effect. Dr. Beck injected the ganglion, and following this he did the Cushing operation, removing the Gasserian ganglion, which was hardened, sectioned, and demonstrated microscopically. It showed no pathological changes, however. This was followed by absence of sweating when pilocarpine was given on the operated side. He had severe pain in the tongue. The neurologist then said he had hysteria. Three weeks later the patient was found to be suffering from sarcoma at the base of the skull.

Dr. HOLMES, in closing the discussion, emphasised the fact that in submitting the paper he was not attempting to present anything new, except the guidance of the syringe by the aid of the naso-pharyngoscope.

(To be continued.)

THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

The President, DR. GEORGE A. LELAND, in the Chair.

Report by DR. EMIL MAYER.

Monday, May 5, 1913.

(Continued from vol. xxviii, p. 666.)

Primary Carcinoma of the Epiglottis.—Emil Mayer.—Primary cancer of the epiglottis is rare, and up to the present time the treatment has consisted of surgical intervention or the use of radium and the X-ray. He had seen two cases. The first was diagnosed as probable malignant disease of the epiglottis, and the subsequent history was that of primary epithelioma of the larynx with subsequent metastasis, laryngectomy, and death. The second case was that of a man, aged sixty-four, who complained of some slight difficulty in swallowing, especially the swallowing of cold liquids. His general condition was good. Examination showed some oedema of the uvula and leukoplakia buccalis. He gave no history of lues. After treatment he improved somewhat, but this did not last, and some six or seven months later there was discomfort in swallowing, a naso-pharyngeal catarrh, and the white patches still present. There were no other evidences of a diseased condition in the throat. About three weeks later a new condition presented itself on the laryngeal surface of the epiglottis. There was a deep ulceration surrounded by a thickened mass. The pathologist pronounced this cylindrical-celled carcinoma. The epiglottis was removed, after the patient had been anaesthetised and the suspension laryngoscope placed in position. There was little bleeding at the time of the operation, but twenty-six hours after the patient began to expectorate large quantities of blood. This bleeding was checked by the application of ice internally and by sprays of peroxide of hydrogen. He left the hospital in ten days.

Broncholith, Bronchial Calculus, or Lung Stone.—Walter F. Chappell.—The patient was a woman, aged fifty-two, who was attacked by severe wheezing, the spasmodic cough lasting an hour at a time, and by intense tickling in the throat. The tickling was below the larynx, and the wheezing in the upper part of the chest, in front and behind. The patient soon raised a small calcareous mass, but the asthma continued. Another coughing spell resulted in the expulsion of a large calcareous mass. Immediately all wheezing stopped and the breathing became absolutely free. Later another calcareous mass was coughed up. Chemically these masses consisted of phosphate of lime. The patient gave no history that would give a clue to the cause for the existence of this condition.

The Removal from the Œsophagus of a Denture embedded for Eighteen Years.—D. Braden Kyle.—The foreign body was very difficult to locate, in spite of its size and shape, on account of the granulation-tissue which had organised into fibrous tissue, together with the curvature

of the spine, as the X-ray picture showed. The patient swallowed the upper plate with four front teeth attached while sleeping. The plate lodged in his throat, and a physician who was called in wished to push it down into the stomach, to which the patient objected. He then went to a hospital, where, after the passage of several instruments, he was assured that he had never swallowed the plate or that it was no longer in the œsophagus. For a few weeks after, the patient felt slight pain in the lower part of the neck at the point he always felt that the object had lodged. After that time there was no sensation, but swallowing has always been difficult. The Kahler œsophagoscope was used, and many attempts were made before the foreign body was successfully removed. By loosening the plate from the fibrous bed by setting up slight inflammatory action and then waiting a few days, the plate was removed without much ulceration.

The Passage of Bacteria through the Tonsillar Tissue.—George B. Wood.—From a study of our experiments it seems that the following conclusions may be drawn. (1) The tonsils in the hog are more readily infected by the anthrax bacillus than any other portion of the buccal or pharyngeal mucosa. The clinical history of this disease in the hog shows that in the great majority of idiopathic cases the pharynx has been the site of invasion, and in all of these cases of pharyngeal diseases the tonsils are the port of entry. In none of the experiments was there any involvement of the pharyngeal or buccal mucosa other than the tonsils. While the culture of anthrax was generally brought into more intimate contact with one of the tonsils, it was impossible to limit the bacilli to the tonsillar surface, and they came into contact with a large part of the pharynx. In the infection an effort was made to rub the emulsion into one tonsil only and in one case the lesions were limited to one tonsil only, but this was not the tonsil on which the culture had been rubbed. (2) Anthrax bacilli penetrate through the crypt and not the surface of the epithelium. (3) The anthrax bacillus probably gains access to the parenchyma of the tonsil by passing through the living, unaltered epithelium, and having gained access through the superficial layers of the epithelium, they tended to multiply in the deeper layers and then pass into the interfollicular tissue. (4) Anthrax bacilli penetrating through the living normal epithelium cause a devitalisation of the tissue, which paves the way for secondary infection from the staphylococci or other pathogenic organisms. (5) The rapidity of the invasion is influenced both by virulence of the organism and the susceptibility of the individual animal. Following the invasion the subsequent course of the disease is similar to that found in other tissues. The toxin elaborated by the bacilli causes at first an accumulation of polymorphonuclear cells, later necrosis of the tissue-cells with disintegration of the nuclei. The germinating follicles show more resistance to the disease than the interfollicular tissue. Associated with the necrotic process is an increase in the number and engorgement of the capillaries, and sometimes there is marked extravasation of the red blood-cells. The anthrax bacilli accumulate in the lymph-spaces and also around the blood-vessel walls. In some of the sections examined the bacilli were found penetrating the blood-vessel walls, and a few were found actually in the blood-current.

Abstracts.

PHARYNX AND NASO-PHARYNX.

Kowler (Mentone).—Retro-pharyngeal Abscess: Operation: Sudden Death.—“*Ann. des Mal. de l'Oreille, etc.*,” vol. xxxviii, Part XII.

A child, aged two, who had suffered three weeks previously from influenza, developed respiratory trouble; swallowing had been impossible for four days, and milk regurgitated by the nose. The voice was nasal in character and breathing became more and more difficult, accompanied by stridor and prominence of the eyes. The right side of the neck was swollen, and the cervical glands were enlarged. Oral examination revealed a bulging in the right tonsillar region extending over to the left side of the middle line. On palpation the swelling felt tense, its upper pole could be defined, but the lower, which extended deeply, could not be reached. In view of the danger which might arise from the sudden rupture of so large an abscess, the author decided to partially evacuate it. This was effected by introducing a blunt hook into the upper part of the swelling. Pus flowed, and palpation afterwards gave the impression of feeling a collapsed ball. The following day the abscess-cavity had refilled. The child was then placed on the knees of an assistant with its head inclined downwards and forwards and an opening made with a blunt hook into the lower part of the swelling. A flood of pus filled the mouth and spurted on to the assistant's feet. As soon as the discharge ceased, the child suddenly turned her head backwards, became deathly pale and expired. The author remarks that all the methods up to the present vaunted, may fail to avoid these catastrophes, and wonders whether gradual emptying of these extensive abscesses by aspiration would not prevent them.

The technique would be as follows: (1) To lightly anaesthetise the patient. (2) To adopt Rose's position. (3) To puncture with a trocar and partially evacuate the abscess. (4) Palpation of the pharynx to gauge the condition of the abscess. (5) Only to have recourse to a second puncture twelve hours after the preceding, till the abscess is evacuated.

H. Clayton Fox.

Robertson, W. N.—Recurring Fibroma of the Naso-pharynx. “*Australasian Medical Gazette*,” June 7, 1913.

A boy, aged ten, was operated on in 1911 for a dense fibrous growth which projected under the zygoma, right side, in front of the masseter muscle. The growth was removed by external incision. It continued through the pterygo-maxillary fossa, and the final portion, which was removed by traction, like a cork out of a bottle, was supposed to come from the sphenoidal sinus of the opposite side. No growth was noticed then in the naso-pharynx. Patient recovered. Eighteen months later he came again. There was a growth in right nostril, and a large mass in naso-pharynx. Preliminary tracheotomy; splitting of soft palate, enucleation of growth with elevators. A prolongation through pterygo-maxillary fissure could not be enucleated. It was seized with a pair of necrosis forceps and twisted out. Recovery.

A. J. Brady.

NOSE.

Heermann (Essen).—Resection of the Septum in Childhood, and the Prevention of Perforation and Flapping. "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

The writer comes to the following conclusions: The submucous resection of the septum, if not too extensive, can be satisfactorily carried out in children with the aid of local anæsthesia alone. It does not lead to post-operative disturbance of the growth of the nose.

Septal spines also should be removed by the submucous method, and not by the saw. *J. S. Fraser.*

Schulz, Adolf (Dantzig).—Local Anæsthesia for the Submucous Resection. "Zeitschr. f. Laryngol.," Bd. vi, Heft 3.

Schulz dissolves a few grains of alypin in suprarenin in a saucer, and applies this on a cotton tampon. After fifteen minutes good anæsthesia and bloodlessness are obtained. He uses the same method for the intra-nasal operations on the antrum, and also for opening the sphenoidal sinus. He finds the mixture less toxic than cocaine with suprarenin.

J. S. Fraser.

Renner, W. Scott.—The Middle Turbinate Body: Some Indications for its Removal. "Annals of Otology, etc.," xxi, p. 443.

Does not refer so much to removal as a part of more radical operations, but rather in connection with reflex neuroses and to assist drainage of accessory sinuses. *Macleod Yearsley.*

Cobb, F. K.—Atrophic Rhinitis and its Treatment by Vaccines. "Annals of Otology, etc.," xxi, p. 463.

In ninety cases cultures were taken after sterilisation of the vestibule. All showed a pure culture of the atrophic bacillus. Forty patients received vaccines, from four to fifty-six injections. The author considers that vaccine injections, if carried out regularly, seem to produce permanent improvements. Irregular or small number of injections cannot be counted on with the same certainty, but marked improvement seems to have followed, even in these cases. As to strength of vaccine, each cubic centimetre contains 100 million bacteria, and the dose varied from $\frac{1}{10}$ c.cm. to $1\frac{1}{2}$ c.cm. *Macleod Yearsley.*

Polyák, L. (Budapest).—The Technique of Intra-nasal Dacryocystostomy. "Archiv für Laryngol.," vol. xxvii, Part III.

A considerable advance was made in the treatment of obstruction of the nasal duct when Toti, in 1904, introduced his method of dacryocystorhinostomy. By means of an external operation the inner (nasal) mucoperiosteal and bony walls of the lachrymal sac are resected so as to secure a wide communication between the sac and the nasal cavity. The lachrymal sac, apart from the portion resected, is preserved and the canaliculi are not slit. In the years 1909 and 1910 both the author and West, independently of one another, devised their methods of window-resection of the duct in the middle meatus without interference with the turbinates. These intra-nasal operations on the duct proved satisfactory in a number of cases, but failed in others in which the stricture was high up or the sac itself much diseased. In such cases the external operation of Toti on the sac was still required. The author has now elaborated a method embodying all the principles of Toti's operation, but performed

through the nose. The duct is opened by means of a chisel immediately in front of the anterior end of the middle turbinal. One blade of a specially constructed cutting-forceps is then inserted and pushed upwards, the jaws of the instrument gradually cutting away the whole of the membranous and bony wall between the sac and the nose. During this process the anterior point of attachment of the middle turbinal is removed, and frequently a few of the ethmoidal cells are opened, as is also the case in the operation of Toti, all the requirements of which are fulfilled without the disadvantage of an external scar.

Thomas Guthrie.

Baumgarten (Budapest).—Cure and Improvement of Visual Disturbances by Nasal Operation. "Archiv. f. Laryngol.," vol. xxv, Part I.

This paper adds another six cases to the eleven already reported by the author in the *Monatschrift für Ohrenheilkunde*, 1910, No. 9, and 1911, No. 6. Of the total number of seventeen cases, fourteen were completely or almost completely cured of their visual disturbance or blindness, in two marked improvement took place, and in one moderate improvement. A similar result is to be expected in all acute and even chronic cases in which the oculist definitely attributes the eye affection to a nasal cause. Of the seventeen cases, five were classed as retrobulbar neuritis, two as amblyopia with normal fundus, three as papillitis acuta, two as papillitis chronica; in three cases neuritis acuta was found, and in two decoloratio papillæ. Central scotoma was present in five cases, paracentral in one, and central colour scotoma in eight. The colour scotoma disappeared in all cases immediately after the first operation, and was always the first sign of improvement.

In reference to the nasal conditions found in these cases and the treatment required the author recognises three groups:

(1) Accessory sinus disease is present, and must receive immediate and energetic treatment.

(2) There is a large ethmoidal bulla or marked swelling of the middle turbinal, which should always be at once removed.

(3) The middle turbinal is only slightly thickened, or is normal and in contact with the septum. Even in such cases, when the oculist is positive as to the nasal origin of the trouble, operative measures are indicated. Application of cocaine and adrenalin solution to the middle turbinal will sometimes result in an immediate improvement of the vision, but the absence of such improvement should not be regarded as contra-indicating operation. In all these cases the author removes at once enough of the middle turbinal to expose the anterior wall of the sphenoidal sinus, which can then easily be opened if required on the following day.

The most marked visual disturbance is usually associated with accessory sinus disease. In other cases the amount of visual disturbance bears little relation to the degree of enlargement of the bulla or middle turbinal. Under these circumstances the statement of the oculist that the trouble is of nasal origin must suffice, and any delay in resort to operation may be of serious danger to the eye.

Thomas Guthrie.

Levinstein, Dr. Oswald (Berlin).—The Pathology and Treatment of the Nasal Reflex Neuroses which proceed from the Tubercle of the Septum. "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

The first case recorded in this paper is that of a female, aged eighteen, who complained of sudden redness of the left eye, with lachrymation and

pain if she strained her sight at all; these attacks lasted from five to ten minutes, and were accompanied by tickling in the nose and pain between the nose and eye. On examination the septal tubercle on the left side was very sensitive. Pain in the left eye, lachrymation and injection of the conjunctiva were produced when this part was touched with a probe, but these symptoms at once passed off on the application of cocaine. Levinstein cauterised the tubercle on three occasions and obtained a cure.

The second case is that of a female, aged twenty, who had suffered from attacks of frontal headache for one year. In this case also the nose was normal except for hyperæsthesia of the septal tubercle. The cocaine experiment was again positive, and deep application of the cautery on both sides resulted in cure.

Six similar cases are reported, but in two the tubercle of the septum was hyperplastic. Levinstein thinks that the condition present in these cases was due to a sudden filling with blood of the cavernous spaces in the tubercle of the septum.

J. S. Fraser.

Coolidge, A.—The Ætiology of Hay-Fever. "Boston Med. and Surg. Journ.," April, 1913.

Smith, T. (Boston).—The Ætiology of Hay-Fever. "Boston Med. and Surg. Journ.," April, 1913.

These two papers both review the more recent theories of the causation of the condition. Coolidge criticises the view advocated by many observers that the primary cause may be found in an instability of the local nerves. Septal deviations or other intra-nasal deformities and the uric acid diathesis are not more satisfactory as ætiological factors. The opinion he is most in favour of is that the primary cause is a biochemical reaction. Both authors refer to the work of Dunbar, who maintained that the exciting agent was a soluble toxin, and therefore must be rendered inert if an antitoxin were prepared and injected into sensitive individuals. By treatment with the serum which he prepared, Dunbar claimed 60 per cent. of cures. In recent years many observers have been struck with the similarity of the phenomena of hay-fever and that of an anaphylactic reaction. This is in direct antagonism to Dunbar's claim, but the rapidity of onset, the asthmatic symptoms and the incapacity to become immunised are in favour of anaphylaxis. Reference is made to Neisser's work. He has recently attempted to secure active immunity by giving increasing doses of pollen toxin; only some fifteen cases were treated, and it is claimed that half the number were benefited.

J. A. Knowles Renshaw.

LARYNX.

Menier, Dr. Marius (Decazeville, France).—The History of the Treatment of Laryngeal Tuberculosis. "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

Dr. Menier points out that voice rest dates back to 1838 and was introduced by Colombat, while tracheotomy in the treatment of phthisis laryngea was first described by Carmichael in 1833 in the *Dublin Medical and Surgical Journal*.

J. S. Fraser.

Levy, Robert.—Laryngeal Tuberculosis. "Journ. Amer. Med. Assoc.," May 17, 1913.

In reviewing the subject of laryngeal tuberculosis the author considers it of such frequent occurrence as to warrant the examination of the

upper air-passages of all cases, or suspected cases, of pulmonary tuberculosis. During the first or earliest manifestation of laryngeal involvement are a slight intermittent hoarseness, excessive sensitiveness and irritability of the pharynx, painful sensations in throat, marked pallor of mucous membrane, of pharynx and larynx, limited movements, slight redness and swelling of the corresponding vocal cord. The onset of tuberculous deposit in the submucous tissue is frequently marked by early pain, and the development of ulceration is characterised by increase in the pain.

Generally speaking the advent of laryngeal complication adds to the gravity of the prognosis. In the matter of treatment an early diagnosis is of paramount importance, and Levy groups the various therapeutic measures under the following heads:

(1) Treatment by means of rest to the vocal organ in conjunction with rest and general hygienic measures.

(2) Local measures—modifications of surgical procedures. Among them the use of the galvano cautery seems to have the most advocates.

(3) The relief of pain by injection or section of the superior laryngeal nerve.

(4) The use of tuberculin.

The most beneficial effect of rest is seen in the cases with unilateral redness or moderate infiltration, but even the ulcerative cases, if not too far advanced, are also markedly benefited. All obstructive lesions of the nose should be appropriately dealt with in order to establish a more healthy condition of the upper air-passages, thereby preventing a chronic catarrhal laryngitis, which, once established, predisposes to tuberculous laryngeal complication. Fresh air, an abundance of sunshine and rest, and a maximum of nutritious food are as essential for the local as for the general condition.

The galvano-cautery may be used in all forms of the disease. Superficial ulcers heal readily under its action, while oedematous infiltrative swellings frequently shrink to comparatively small size. Other more extensive surgical measures may be carried out to advantage in many cases, depending on the extent of the lesion and its limitations.

For the relief of intolerable pain, section or injection with alcohol of the superior laryngeal nerve is advised, preference being given to the latter procedure owing to its simplicity and satisfactory result.

The use of tuberculin must be considered only as an adjunct to local treatment, and its administration must be carefully conducted, preferably in sanatoria.

Birkett (Rogers).

EAR.

Kabatschnik, M.—A New Hearing Test. "Monats. f. Ohrenh.," Year 46, No. 11.

The very considerable variations in the structural consistency of the mastoid process must, in the opinion of the author, so seriously prejudice the accuracy of those tests associated with the names of Rinne and Schwabach that he has been led to introduce other methods, which, he claims, eliminate these errors.

His test consists essentially in occluding the external auditory meatus of the ear in question with a finger, to the nail of which the handle of a vibrating tuning-fork is then applied. The inference is drawn in the usual way by noting the report of the patient as to the intensity of the sound in this position compared with that when the fork is held

before the unoccluded ear. Differential diagnosis between affections of the sound-conducting apparatus and sensation is made in a corresponding manner to that adopted in the original tests.

In addition to an improvement on the older methods the author considers that with his modification bone-conduction from the affected side to the healthy ear is "scarcely possible," and further, that it may prove useful in detecting malingering.

[It is difficult to understand how the writer can have overlooked the fact that occlusion of the meatus at once introduces the possibility of the production of those phenomena on which Gellé's test is based, and which thus surely renders his proposed modifications unreliable in this respect—it is obvious that a difference in the force with which the meatus is occluded may easily lead to a varying report in the case of a functional stapedio-vestibular articulation.—A. R. T.] *Alex. R. Tweedie.*

Denker, Prof. Alfred.—**Upon the Present Status of Otosclerosis.**
"Annals of Otology," xxii, p. 1.

In this admirable paper Prof. Denker defines otosclerosis as a disease in which there is a permeable tube and a normal tympanic membrane, accompanied by a definite and characteristically marked clinical picture of a progressive difficulty in hearing, as shown by functional tests and a pathologico-anatomical picture showing loss of movement of the stapes from bony ankylosis and progressive spongification of the bony labyrinthine capsule, with, in addition, an atrophic degenerative process in the nerve-endings in the membranous labyrinth. He prefers to retain the old title of "otosclerosis" until its aetiology and pathological anatomy are cleared up. He discusses the opposed theories as to the primary or secondary nature of the condition, and corrects the erroneous statement of Heimann and Fröschels that he (Denker) considered it as following middle-ear inflammation. He points out that the coincidence of pregnancy with the beginning of otosclerosis suggests a causal relationship between the function of the hypophysis cerebri and the ear disease, and surmises that there is a possibility of an aetiological connection between malfunction of the hypophysis and the origin of otosclerosis, especially in persons with an hereditary taint, acknowledging, however, that only a portion of the cases can be thus explained. From the variability of the lesions found and the resulting symptom-complex, otosclerosis may be divided into three forms: (1) Isolated stapes ankylosis; (2) multiple spongifying foci in the labyrinth capsule, with atrophic degeneration of the membranous labyrinth without stapes ankylosis; (3) a combination of (1) and (2). Discussing the subject of treatment, Denker is against local operative treatment. Otomassage is useful when subjective noises are marked. He thinks more is to be expected from the internal administration of phosphorus than from iodide of potassium, diplococcus serum, etc. He has used phosphorus for many years—for the past three in the form of phytin. Recently he has been giving hypophysin or pituitrin. In women, ovarian or spermin tablets may be tried. Of otosclerol and vasotonin he has no experience.

Macleod Yearsley.

Reh and Méroz.—**Pseudo-diphtheria Bacillus in Cases of Otitis Media.**
"Rev. Med. de la Suisse Romande," January, 1913.

Pseudo-diphtheria bacilli are often present in the pus in otitis media, generally associated with strepto-, staphylo-, or pneumococci, rarely in pure culture. They come from the naso-pharynx or from the external

meatus, and have no pathogenic significance. For this reason it is important to have some ready means of distinguishing them from true Loeffler's bacilli. The authors consider that hitherto the only sure method for making such differential diagnosis was by inoculation of guinea-pigs, as their morphological, cultural, staining characters, etc., are either inconstant, or require too prolonged investigation to be of any clinical value. The authors have devised a method of making this differential diagnosis. It depends on the fact that Loeffler's bacillus when stained by Gram's method retains the staining only on condition of not being exposed to the action of alcohol too long, whereas pseudodiphtheria bacillus retains the staining even when exposed to the action of alcohol for an indefinite time. Their method has not been used in many cases, but so far has given positive results.

Arthur J. Hutchison.

Gatscher, Siegfried.—Fatal Mediastinitis, the Result of a Retro-pharyngeal Abscess following Acute Purulent Otitis Media.
 "Monatss. f. Ohrenh.," year 47, No. 5.

A man, aged thirty-three, was brought into Prof. Urbantschitsch's clinic in a quite neglected condition, with the report that his left ear had been affected for the last five weeks, following an attack of influenza. Some days after the trouble commenced he had pain on swallowing, which, however, soon ceased. There was now a profuse foetid purulent discharge from the left ear, the tympanic membrane of which was injected and hard to see on account of the secretion. No tenderness of the mastoid. Two days later pressure on the left side of the throat caused discharge of pus from the meatus, the left tonsil was slightly swollen, the anterior auricular glands enlarged, and the antrum tender.

Operation revealed a diseased antrum and cells extending throughout the whole bone from the tegmen to the tip. The next day, as on examination of the pharynx a profuse flow of pus appeared in and around the left linguo-tonsillar region, the patient was transferred to the laryngological clinic. Here, as his condition became so much worse, the mediastinum was opened on both sides, but the patient rapidly succumbed.

Post-mortem.—Pus had apparently broken through the floor of the tympanum and tracked down and around the pharynx and larynx, passing over to the opposite side, and eventually infecting the mediastinum on both sides.

Alex. R. Tweedie.

Tovey (Jun.), G. L.—Operative Treatment of Sinus Thrombosis. "Annals of Otol., Rhinol., and Laryngol.," vol. xxi, p. 362.

A useful paper, giving a summary of 73 cases (48 males, 25 females), which is, briefly, as follows: Right ear, 49; left ear, 24; acute, 56; chronic, 17. Temperature: septic, 60; variable, with remissions, 9; none, 4. Chills: distinct, 41; chilly sensation, 19; none, 13. Eyes: optic neuritis, 12; slight engorgement, 7; no change, 54. Blood: white count, 15,000; red count, 78 $\frac{2}{3}$. Diagnosis: made before mastoid operation, 32; secondary to mastoid operation, 30; at time of mastoid operation, 11 (sinus wall necrosed in 3). Metastases: 6 cases after ligation of vein. Result: well, 61; died, 12 (cavernous sinus thrombosis, 2; general septicæmia, with metastases, 4; admitted unconscious and *in extremis*, 5; scarlatina intercurring during convalescence, 1). Sinus thrombosis found as complication in following fatal cases: tuberculous

meningitis, 1; septic meningitis, 6; temporo-sphenoidal abscess, 3; cerebellar abscess, 1.

Macleod Yearsley.

MISCELLANEOUS.

Marshall.—Correction of External Nasal Deformities. "The Journal of the American Medical Association," January 18, 1913.

For the correction of external deformities of the nose, most of which are combined with serious nasal obstructions, the author has devised a new operation, the essential feature of which is to cut through the nasal process of the superior maxillary bone. The technique of the operation is as follows: With a narrow-bladed knife an incision is made directly over the nasal process of the superior maxillary bone at the point where the elevation which makes the nasal prominence begins. The incision is made parallel to the normal line of the nose, a length of 0.25 cm. The nasal process is cut through at this point with a bevelled chisel, and pressure is thus made by an assistant to control bleeding, while the opposite side is treated in like manner. By means of a broad-bladed forceps, one blade of which enters the nasal passage, the opposite blade remaining outside, the operator completes by a fracture the mobility of the nasal process along its entire line. Both sides are similarly dealt with. If there is a nasal obstruction through the malposition of the septum, the septum is seized with the same forceps and forced into a correct position by loosening its articulations without separating them. The nose is not likely yet to be in a straight line, the defect lying at the suture between the frontal and upper extremities of the two nasal bones and both processes of the superior maxilla. The faulty angle can be straightened by a sharp stroke with the mallet at this point, guarded by a rubber-covered lead plate, the force being directed downwards from the frontal bone, but toward the obtuse angle. Elevation can be assisted sometimes to advantage with a large urethral sound.

The lines of incision are covered by iodoform gauze and collodion; the lower part of the nose is encased in a collodion dressing, and in some cases nasal splints are inserted for twenty-four hours or more.

Birkett (Rogers).

REVIEWS.

Asthma and its Radical Treatment. By JAS. ADAM, M.D., F.R.F.P.S. Pp. 184. Illustrated. London: Henry Kimpton, 1913. Price 5s.

The author treats his subject under eleven headings, and of these not the least interesting are his introductory remarks, wherein he condemns the labelling of asthma as a neurosis, and formulates his thesis, viz. that asthma is primarily a toxæmia. He brings evidence that arterial tension is low rather than high in asthmatics, even during "an attack," and cites the periodicity of asthma, the urine conditions, as well as the results he has obtained from dietetic treatment to support his view that asthma is a toxæmia. Rhinologists will be interested in the sections where the author directs attention to nasal abnormalities in connection with asthma. He lays stress on the importance of removing adverse nasal conditions, but equally emphasises the importance of having regard to the essential underlying cause of asthma, viz. the toxæmic state, and regards

the nasal affections as factors which tend to excite attacks, though not the essential cause of the disease we term asthma.

The author states (page 82) that "it is a mistake to say that the respiratory difficulty is mainly expiratory. If you systematically ask asthmatics whether their greater difficulty is respiratory or expiratory, the majority will say inspiratory, some will say both, others expiratory." One may reply that this affords no proof that the difficulty is essentially inspiratory, for it is useless to rely merely on patients' impressions, and further, that on page 13 the author himself affords the explanation, which refutes what he says on page 82.

It is extraordinary that most writers on asthma appear to hold a brief for the continuous bronchial spasm theory as the essential factor in asthmatic attacks, failing to see that the evidence that the bronchioles actively dilate as well as contract is at least equal to the evidence that they can only contract. Dr. Adam shares the common fate of those who try to find some logical explanation of continuous bronchial spasm, resulting in pulmonary distension, and here his usually sound reasoning is abandoned.

The chapter on treatment is most valuable, and lays down a dietetic regimen which the author has found very successful. He fully believes in removing nasal defects. Francis is given the credit of treating the nose by cauterisation, though Francis did not introduce the method of cauterisation.

We have exercised the prerogative of a critic to criticise one of the most illuminative monographs on asthma it has been our privilege to read, for the author has kept himself abreast of recent work, both physiological and clinical, and his views, based on a ripe personal experience, are well balanced. Dr. Adam combines the wide knowledge of the practised physician with the special rhinological experience in relation to asthma, avoiding the usual agnosticism of the one and the too often restricted views of the other.

Although on some points we cannot follow the author entirely, we are sure that very few physicians or rhinologists can read this small yet excellent monograph without deriving pleasure for himself and profit for his patients.

P. Watson-Williams.

Diseases of the Ear. By PHILIP D. KERRISON, M.D. Pp. 588. 331 illustrations in the text, and 2 full pages in colour. Philadelphia and London: J. B. Lippincott Co. Price 21s. net.

In this, the latest addition to otological literature, Dr. Kerrison has presented the subject to his readers in a way alike comprehensive, logical and clearly expressed. The illustrations, many of them in colour, and diagrams are well selected and apposite to the text.

After dealing with methods of examination and diagnosis, useful chapters on acute and chronic middle-ear diseases are given. Among other points insisted upon are: that a negative Rinne reaction always indicates partial or complete stapedial ankylosis, agreeing with Bezold that the ratio between air- and bone-conduction is never absolutely reversed without structural alteration of the mobility of the stapes; that treatment of the Eustachian tube *viâ* the naso-pharynx in non-suppurative conditions is of paramount importance; and that a marginal perforation of the membrane in chronic suppuration always means osseous necrosis.

The methods of conducting tests of labyrinthine function, rotatory, caloric and galvanic, together with their meaning, are dealt with in an admirable chapter expressed with somewhat unusual clearness, and the

use of labyrinthine signs and symptoms in the differential diagnosis of allied labyrinthine affections is very carefully worked out. It is to be noted that the fact is emphasised that, in diffuse labyrinthine suppuration, the radical operation alone—without at the same time opening and draining the labyrinth—actually adds to the danger of intracranial infection.

In suspected lateral sinus thrombosis, Kerrison is opposed to opening the sinus unless there is very definite evidence of the presence of a clot. He confesses, however, that this view will not have the support of many distinguished aural surgeons. Aspiration movements of the sinus are, he has found, very suggestive of the presence of a thrombus.

The chapters dealing with aural operations are satisfactory. In operating for acute mastoiditis he does not consider it advisable to take too much pains to secure a smooth bone cavity; too great smoothness, he believes, interferes with the formation of granulations. In the radical mastoid operation he does not favour primary skin-grafting.

Valuable chapters are those on the use of salvarsan and vaccines in the treatment of aural disease. With regard to the former, the author gives its indications, with statistics dealing with the frequency of cranial nerve lesions following its use. He considers the leucocyte extract of His to be of decided value in selected cases.

Although there is little that is original or entirely new in Dr. Kerrison's text-book, it is valuable from the fact that it brings into line most of the latest work upon its subject, and, as such, it should prove of great use to students and practitioners of otology.

MacLeod Yearsley.

NOTES AND QUERIES.

"It would be interesting to learn how far the linguistic peculiarities of a race are moulded by its susceptibility to colds in the head.

"The pronunciation of the gutturals and sibilants of the Teuton and Slav is unaffected by the circumstance that the speaker may be suffering from nasal catarrh.

"The melodious tones of Italy, Spain and many other Celtic nations can only be produced by generations of men accustomed to inhabit lands where the air is soft and warm, and conducive to indolence rather than to obstruction of the nose."—From "How to Avoid Colds: By One who does" (*Anon.*).

SALICYLATE OF IRON FOR ACUTE TONSILLITIS AND ERYSIPELAS.

M. C. S. Lawrence speaks highly of this drug in the diseases mentioned. He has found it abort the development of the latter. The dose is 3 to 10 grains, every three hours. — *Practitioner*, March, 1913, p. 633.

It gives us great pleasure to intimate that Prof. Killian, of Berlin, has been unanimously elected Semon Lecturer in Laryngology of the University of London for 1914, and that he has accepted the nomination. The Lecture will be delivered towards the end of May.

We have much pleasure in informing our readers that Prof. Killian has been elected, by the Verein Deutscher Laryngologen, President of the next International Congress of Laryngology, to be held in Hamburg in 1915 contemporaneously with the International Congress of Otology under the presidency of Prof. Denker.

THE CURE OF DEAFNESS BY RADIUM.

"Retzius" asks: "Can you or your readers inform me as to whether any further evidence has come to hand as to the utility of radium in deafness? A reply under the following heads would be much valued:

"(1) Nature of aural disease in which it is most likely to prove useful.

"(2) Dose, method of application, and frequency and duration of *séances*."

THE
JOURNAL OF LARYNGOLOGY.
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

**REPORTS FOR THE YEAR 1913 FROM THE EAR AND THROAT
DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.**

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

I. A PECULIAR FORM OF HYPERPLASIA OF THE
MUCOUS MEMBRANE OF THE UPPER RESPIRA-
TORY TRACT.

BY A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

THE above title has been given to this paper partly because the two cases described in it cannot be placed under any hitherto well-recognised type of disease, and partly because a somewhat similar if not identical condition has been previously discussed under the same title by Sir Felix Semon. It will probably prove more satisfactory to give a detailed account of my own cases in the first place and then to discuss them along with the small series of published cases which resemble them in some important features though differing in others. The earlier history of the first case has already appeared in the *Transactions of the Laryngological Society of London*, 1904, but its subsequent course is now dealt with for the first time. The second case has not been previously published, but was shown at the meeting of the Scottish Otological and Laryngological Society in November, 1913.

CASE 1.—J. M. G —, male, aged forty-four, was first seen on July 2, 1903, suffering from acute laryngeal obstruction which necessitated an immediate tracheotomy. The history obtained from his medical adviser, Dr. Brown Darling,

was to the effect that the patient had suffered for four days from an acute sore throat with elevation of temperature. There was considerable swelling of the uvula and soft palate, but no evidence of any false membrane. On the third day of the illness considerable difficulty in breathing supervened, but not sufficient to demand immediate operation. On the following morning, however, owing to great respiratory distress accompanied with cyanosis, tracheotomy was hurriedly performed by Dr. Darling. No membrane was coughed up.

Two days later I had an opportunity of examining the patient. The nose and naso-pharynx showed no abnormality. The uvula and soft palate were œdematous; the epiglottis was red and swollen and curved backwards so as to form a narrow horse-shoe-shaped slit. The arytenoids were markedly swollen and no view of the interior of the larynx could be obtained. The mucosa showed no evidence of any false membrane.

Further inquiry into the patient's history threw no definite light upon the nature of the affection. He had been in his usual state of health, attending to his business, and had retired to bed feeling perfectly well, but three hours later had wakened with great pain in his throat and slight difficulty in breathing. He was a tall, well-developed man and had not suffered from any similar attacks previously; he had not had his throat examined prior to the present illness. No history of syphilis could be obtained. He had no pulmonary trouble, cough or expectoration.

On the tenth day after the tracheotomy the tube was removed and the wound rapidly closed. Slight inspiratory difficulty was still complained of when a deep inspiration was taken. During sleep some inspiratory stridor was occasionally noted.

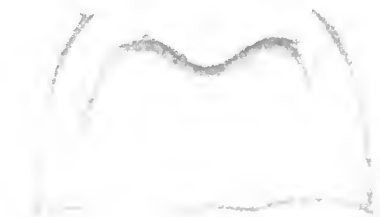
A second examination of the throat was obtained three months later (October, 1903). The appearances were very similar to those observed immediately after the acute attack. The uvula and the soft palate, especially on the left side, were œdematous; the swelling presented a smooth surface and had a slight yellowish appearance. The epiglottis was thickened, rigid, and curved backwards; the arytenoids, especially the left, were œdematous and pale in colour; only the posterior part of the right vocal cord, normal in appearance, could be seen. There was no evidence of ulceration. The voice was natural. There was no dysphagia.

At this date a consultation was arranged with Dr. P. M'Bride, who was in favour of the syphilitic nature of the affection, and a course of potassium iodide and mercury was commenced.

On December 8, 1903, after two months of antispecific treatment, the throat was again examined. During this period the patient had felt very much better and had had no further respiratory difficulty. The local condition, however, was practically the same as it had been in July and October; it is unnecessary to recapitulate the appearances then observed. An additional area of swelling was for the first time noticed; the left lateral wall of the pharynx had become swollen and presented a thickened band similar in appearance to the œdema of the soft palate. A small piece of tissue was removed from the thickened band on the left lateral pharyngeal wall. Microscopic examination revealed no evidence of tuberculosis, syphilis or malignancy. The connective-tissue spaces were œdematous, the blood-vessels, both arterial and venous, were much engorged, and there were areas of small-cell infiltration. No bacteriological examination was made.

On January 15th, 1904, the patient kindly consented to show himself at the meeting of the Laryngological Society of London, and the opinions there expressed will be referred to later. Up to this stage the facts concerning the patient have already been recorded in the Transactions of the Society.

PLATE I.



Appearance presented by the soft palate, fauces and pharynx
in Case 2.

TO ILLUSTRATE DR. A. LOGAN TURNER'S PAPER ON A PECULIAR FORM OF
HYPERPLASIA OF THE MUCCOUS MEMBRANE OF THE UPPER RESPIRATORY
TRACT.

The subsequent history of the case, covering a period of almost ten years, may now be briefly described. During the period from 1904-1910, the patient suffered frequently from colds, and on these occasions he had some respiratory trouble. His throat was examined occasionally by his medical adviser and little change was observed in it. In March, 1910, he had a second severe attack of laryngeal obstruction which nearly made tracheotomy again necessary. At this date he consulted Dr. John Macintyre, who suggested that he should see Sir Almroth Wright with a view to commencing a course of vaccine treatment. A growth of *Streptococcus pyogenes* was obtained from the throat and an autogenous vaccine was given. The vaccines were continued almost without interruption for eighteen months, that is until the end of the year 1912. During that period and subsequently the catarrhal attacks almost disappeared and he has had no trouble with his breathing. His general health has been excellent.

In October, 1913, I again had an opportunity of examining his throat. The uvula and soft palate presented practically a normal appearance. The left posterior pillar of the fauces was uniformly thickened, smooth, and of a greyish colour. The epiglottis, of a reddish colour and thicker than normal, was curved backwards and rigid. The left arytenoid was large and pale and the left aryepiglottic fold had a thickened rolled sausage-like appearance, pale in its more prominent part and slightly pink laterally. The left vocal cord was concealed from view, but the right cord could be seen, normal in outline. The oedema of the uvula and soft palate, the thickened band on the left lateral wall of the pharynx and the slight swelling of the right arytenoid observed in 1903 had disappeared at this date.

CASE 2.—J. F——, female, aged fifty-two, unmarried, was sent to me in November, 1912, by Dr. Burn-Murdoch. She complained of an occasional choking feeling in the throat and sometimes she experienced slight difficulty in breathing. These symptoms had troubled her for six months. She had not been subject to sore throats, but was liable to take colds.

The patient was one of a family of eight, and was born and brought up in the Highlands of Scotland. She had never been outside her own country and had spent thirty-five years of her life in domestic service, latterly being employed as a cook. She had always enjoyed good health, though occasionally she had suffered from anæmia. There was no history of any acute illness. Her father died of consumption at the age of sixty-six, but there was no evidence of tubercle in any of his children. Her mother died at the age of sixty-seven, but the nature of her last illness was not very definite.

The patient presented a well-nourished appearance. Her complexion was pale, with perhaps a slight tinge of colour in the malar regions, and she had a certain heaviness of expression. There was no oedema of the lower eyelids, and no thickening of the tissues. The skin was not rough, nor were the hands broadened. The interior of the nose showed no abnormality, nor was any change observed in the naso-pharynx, though a good examination of this region was not obtained on account of the condition of the soft palate. The tongue and buccal mucosa were normal. The soft palate, fauces and pharynx were here and there smeared with a thin layer of sticky mucoid secretion, necessitating the application of a cotton-wool mop for its complete removal. The surface of the soft palate and uvula presented a peculiar smooth, shiny appearance in which a slight yellowish tinge was visible (Plate I). In association with this there was a more or less uniform thickening of the soft palate and uvula, the free edges of which had a thickened, rolled appearance (Plate II, fig. 1). At first sight the impression was formed that the uvula had been removed, because only a short rounded stump represented that structure. No such operation, however, had been performed. On the left side

the infiltration also involved the posterior faucial pillar so that it projected from behind the tonsil. The anterior faucial pillars were not thickened. There was no evidence of ulceration. The movements of the soft palate were somewhat restricted, and on palpation it felt firmer to the touch than the normal palate. In the centre of the posterior pharyngeal wall there was an area of normal mucous membrane, but on each side of this a slightly thickened vertical band of tissue was observed extending upwards behind the soft palate, that on the left side being slightly more pronounced than on the right. The extent of these bands, however, was somewhat limited, as they did not encroach upon the naso-pharynx above, nor did they extend downwards to any appreciable distance into the laryngo-pharynx. They were of a greyish colour faintly tinged with pink.

Owing to the thickening of the soft palate and its consequent restricted movement, posterior rhinoscopy was somewhat interfered with, but no thickening of the naso-pharynx was apparent, and the choanæ could be clearly defined.

Laryngoscopy revealed the following changes in the larynx: The epiglottis was uniformly thickened and rigid, and its smooth surface was of a pinkish colour faintly tinged with yellow. Both arytaenoids, especially the left, were swollen, the swelling involving the ary-epiglottic folds (Plate II, fig. 2). In colour these structures offered a distinct contrast to the epiglottis, being pale and more closely resembling the pseudo-œdematous infiltration of tubercle. There was an entire absence of ulceration. The swelling of the upper laryngeal aperture prevented inspection of the interior of the larynx during quiet respiration, but, on phonation, the normal vocal cords moving freely became visible in part. The voice was unaffected.

As the case was obviously one of unusual interest, the patient was admitted to hospital for a more complete examination. No subcutaneous œdema or localised infiltrations were detected elsewhere on the body. The urine was normal. There was no evidence of bronchial or pulmonary mischief and von Pirquet's reaction was negative. Wassermann's reaction was also negative. Examination of the blood gave the following result: red blood-corpuscles, 3,200,000; white cells, 6400; polymorphonuclears, 64 per cent.; lymphocytes, 32 per cent.; no glandular enlargement could be detected anywhere in the body.

Swabs were taken from the sticky secretion on the posterior pharyngeal wall and cultures were made. I must here express my great indebtedness to Dr. N. Hay Bolton for his careful bacteriological report and for the preparation of the tissue removed from the soft palate. Secretion was obtained from the throat on two separate occasions and the same organisms were found in both samples. Two varieties of cocci and two forms of bacilli were cultivated.

Small cocci mostly in pairs, rounded or slightly oval, forming on agar plates, rounded, yellowish, granular colonies and producing on gelatine plates a slow liquefaction. After being subjected to a

PLATE II.



FIG. 1.—Black and white sketch of the fauces and pharynx in Case 2, J. F——, showing infiltration of soft palate, posterior pillars and pharyngeal walls.



FIG. 2.—The infiltrated appearance of the upper laryngeal aperture in Case 2, J. F——.

TO ILLUSTRATE DR. A. LOGAN TURNER'S PAPER ON A PECULIAR FORM OF
HYPERPLASIA OF THE MUCOUS MEMBRANE OF THE UPPER RESPIRATORY
TRACT.

PLATE III.



FIG. 3.— $\times 60$ diam. Showing arrangement of intact epithelium, small cell infiltration, lymph node and gland acini.



FIG. 4.— $\times 200$ diam. Showing loose connective-tissue stroma and cells.

TO ILLUSTRATE DR. A. LOGAN TURNER'S PAPER ON A PECULIAR FORM OF
HYPERPLASIA OF THE MUCCOUS MEMBRANE OF THE UPPER RESPIRATORY
TRACT.

variety of tests, the organism was identified as the *Micrococcus subflavus*.

A small round coccus in short chains, mainly diplococci grown on agar and gelatine plates as small, whitish, semi-transparent granular colonies identified as the *pneumococcus*. Two varieties of bacillus, one, small with rounded ends occurring singly and identified as *Bacillus coeques albus*, the other, occurring both singly and in chains of two and three, and probably the *Bacillus spiniferus*.

A piece of tissue was removed from the thickened edge of the soft palate close to the base of the uvula, and a number of sections were stained in a variety of ways both for bacteriological and histological examination. The stains used for the detection of organisms were methylene-blue, carbol thionine blue, Kuhn's blue and Gram's method. No organisms were found in the tissues. For histological purposes hæmatoxylin and eosin, hæmatoxylin and picro-fuchsin, eosin and methylene-blue were employed. The tissue showed the following structure (Pl. III, figs. 3 and 4). The surface epithelium was normal and intact and presented the ordinary arrangement of the papillæ. The sub-epithelial tissue consisted of a finely fibrillar connective-tissue stroma showing an increase from the normal, the fibrils being separated by œdema. In certain areas, especially beneath the surface epithelium and between the clumps of gland acini, there was an increase in the small-cell infiltration, being more noticeable in the latter situation. The cells for the most part were mononuclear, though polymorpho-nuclear and plasma-cells could be detected. Here and there a lymph-node was visible. The blood-vessels and lymph-spaces were somewhat dilated. The mucous glands, round which there was considerable small-cell infiltration, showed no change in their epithelial cells. There was no evidence of tubercle, syphilis or rhinoscleroma. The appearances suggested a subacute inflammatory process.

The patient was examined from time to time during 1913, and although the local appearances have undergone no change, on more than one occasion, some slight improvement was observed in the throat, difficult to describe, but sufficiently obvious to the eye to be commented upon. It was, however, never more than of a temporary nature. Her facial appearance suggested the possibility of a myxœdematous change and a course of thyroid was commenced, and continued over a period of three months without bringing about any alteration in the local condition, although the patient

expressed herself as enjoying better health during its administration. At the beginning of 1914 the patient has again taken service as a cook.

In 1901 Brown Kelly reported in the *Lancet* of April 6 under the title of "Sclerotic Hyperplasia of the Pharynx and Nasopharynx" the case of a man, aged thirty-four, who for eight years had been subject to slight sore throats, and during the last three years experienced the sensation of having something in his pharynx. Examination showed the uvula pale in colour, smooth on the surface and of fibrous consistence, hanging like a curtain and concealing the posterior pharyngeal wall. In the centre of this wall there was a narrow, mesial tract of normal tissue, while on each side lay a broad prominent band extending on to the lateral wall and incorporating part of the right and the whole of the left posterior faucial pillar. Each of these bands, smooth in outline and of a uniform grey colour, passed upwards into the nasopharynx and downwards into the lower part of the pharynx, in the latter situation overhanging the arytaenoids and lying in contact with the margins of the epiglottis. The larynx, so far as it was possible to see it, was normal. The nasopharynx, examined after removal of the uvula, hardly admitted the end of the forefinger, being reduced in size by the upward continuation of the pharyngeal bands and the thickening of the soft palate. The thickening on the roof of the space was most marked laterally and presented a smooth, grey, firm appearance concealing the choanal arches, the Eustachian tubes and part of the nasal septum. The infiltration was everywhere devoid of ulceration. Practically no change was observed in the local condition during the two years in which the patient was under observation. On one occasion, however, he developed an acute septic condition of the throat, during which there was considerable increase in the local swelling, especially on the left side.

Through the kindness of Dr. Brown Kelly I have been able to give the further history of this case. In June, 1901, the uvula was found to have become soft and flexible, and the band on the right side of the pharynx had shrunk to some extent; the nasopharynx was therefore more open and a better view also could be obtained of the larynx. In 1903 the entire right half of the larynx was visible owing to further shrinkage of the right lateral band. In 1905, on the other hand, all the affected areas were again larger, while in 1907 the hyperplasias were slightly smaller than in 1903. In December, 1913, the uvula was large and soft and measured

$\frac{5}{8}$ in. in breadth; the right lateral band had diminished considerably so that this region did not appear abnormal. The left lateral band, on the other hand, was markedly enlarged, and its smooth red surface resembled that of a gumma; it passed upwards into the naso-pharynx so as to conceal to some extent the corresponding choanal arch, while below it slightly overhung the left arytaenoid. While the infiltration has lost its hard consistence and diminished somewhat in size since the case was reported in April, 1901, during the last six years scarcely any further change of this kind has been observed.

In the *Lancet* of February 25, 1905, Sir Felix Semon described two cases of chronic hyperplasia of the mucous membrane of the pharynx and larynx, and referred to a third which had been under his observation. Case 1 was that of a lady, aged thirty, who had complained for many months of general discomfort in her throat and of considerable difficulty in swallowing. Her general health had not suffered. Her soft palate, uvula and arches, posterior wall of pharynx, epiglottis, ary-epiglottic folds and arytaenoid regions were uniformly thickened, and presented a peculiar yellowish, shiny, somewhat gelatinous-looking appearance, suggesting very much the aspect of a lardaceous kidney. The infiltration was markedly smooth. The mobility of the arytaenoids was unimpaired. The patient was kept under observation for nearly two years, during which time no method of treatment was of any avail. Two years later, however, she reported herself with the throat in a perfectly normal condition.

The second case detailed by Semon had been shown to the Laryngological Society of London on November 7, 1902. The patient was also a woman with a history of long-standing throat trouble and occasional difficulty in swallowing. The uvula and adjacent parts of the soft palate were considerably infiltrated and at the same time quite smooth to sight and touch, while the most characteristic point consisted in the peculiar yellowish colour of the affected parts, resembling the appearance of a waxy kidney. The mucous membrane over the arytaenoid cartilages was in a similar condition, the left being slightly more oedematous, simulating the ordinary pseudo-oedematous infiltration of tuberculosis, but, though more transparent than its fellow, both had a yellow colour. Kidneys and lungs were healthy. The condition appeared to vary from day to day. When examined five months later she expressed herself as feeling distinctly better, and the uvula and right arytaenoid looked much less infiltrated than they had been

at the previous examination. The patient had been treated with arsenic and iron.

The third of Semon's cases was a woman, aged forty, whom he saw on only one occasion. The local appearances were similar to those observed in the first case, but much less developed.

A careful search through the *Transactions of the Laryngological Society of London* and of the Section of Laryngology of the Royal Society of Medicine from 1902 to 1913 inclusive has not disclosed the report of any cases exactly similar to the six above detailed. It is true that there are a few which at first sight might be regarded clinically as resembling the above, but more minute examination has revealed important points of difference. Thus, Dundas Grant in February, 1903, showed a patient in whom the palate and pillars of the fauces were slightly thickened and the epiglottis and ary-epiglottic folds, especially the left, were affected with a pale, somewhat solid œdema free from ulceration. Under anti-syphilitic treatment the condition greatly improved. In March, 1903, Lambert Lack showed a boy with œdematous thickening of the palate and larynx. Microscopical sections of the enlarged epiglottis demonstrated numerous roundish nodules which strongly resembled, though they were not characteristic of, tubercle.¹ In December, 1912, C. W. M. Hope showed a woman, aged thirty, with a solid white swelling of the uvula and adjacent soft palate and with a similar condition of the epiglottis, arytenoids and ary-epiglottic folds. As the patient had lived in Norway leprosy was suggested; the palate was not anæsthetic. The Wassermann reaction was positive. Mr. Hope has kindly informed me (November, 1913) that after two injections of salvarsan the affected parts resumed their normal appearance with the exception of the uvula, which still presented a white, swollen appearance.

Text-books on diseases of the throat published both in this country and abroad, so far as I have been able to consult them, do not appear to deal with this condition.

When we attempt to summarise the more important features observed in the patients affected with this form of chronic hyperplasia, it must be noted that of the six cases four were women and two men, that while the age in one case was not stated, the remaining five were 30, 34, 40, 44, and 52 respectively. All of them had

¹ Dr. Lambert Lack also showed a boy, aged nine, with diffuse thickening of the uvula, pillars of fauces, adjacent part of soft palate, and upper laryngeal aperture: condition chronic, not ulcerating, probably due to congenital syphilis; positive Wassermann, no response to iodide, mercury and salvarsan. Microscopic sections threw no light on pathology (*Trans. Roy. Soc. Med.*, January, 1914).

apparently enjoyed good health, and with the exception of the throat affection there was no evidence of disease elsewhere. The outstanding clinical feature was a smooth, uniform, more or less diffuse infiltration of the uvula and soft palate along with the palatal pillars, the posterior wall of the pharynx and the structures forming the upper aperture of the larynx. In Brown Kelly's case only the larynx was unaffected, and a further difference was observed in his case in the fact that the infiltration involved the naso-pharynx. An entire absence of ulceration characterised all the cases, and probably owing to this, pain was not a symptom that was complained of.

It is evident from the descriptive accounts that the colour of the affected parts is not identical in each case, and certain variations can be noted. Thus in Brown Kelly's patient the uvula was pale and the thickened pharyngeal bands were of a grey colour. Semon emphasised the shiny aspect and yellow coloration of the soft palate in his cases, recalling to his mind the appearance of the waxy kidney, and while the same yellowish tinge was visible to a slighter extent in the laryngeal infiltration, the arytænoid swellings bore some resemblance to the pseudo-œdematous infiltration of tubercle. In the second of my two cases the shiny appearance of the soft palate was quite distinctive and a yellowish tinge was observed. In both of my cases the epiglottis showed a reddish coloration which contrasted with the paler appearance of the arytænoïds and aryepiglottic folds. In none of the cases were the movements of the vocal cords interfered with, the voice in every instance being unaffected.

The following facts may be noted in connection with the clinical course of these cases. In Brown Kelly's patient, observed at intervals during a period of fourteen years, the hyperplasia lost its hard consistence and diminished in size at first. Later, further diminution was noticed, but during the last six years there has been scarcely any change. In one of Semon's cases the throat and larynx had returned to a perfectly normal condition four years after she was first examined, though during the first half of this period no change in the local appearances was observed. In another of his patients the uvula and the right arytænoid appeared to be less infiltrated four months after the first examination. My first patient, seen from time to time during a period of ten years, showed distinct evidence of improvement. The uvula, soft palate and pharynx resumed their normal appearance, and the slight swelling of the right arytænoid noticed at first had also disappeared. The changes

observed in the epiglottis, left arytaenoid and left ary-epiglottic fold, however, remained. In my second case, which has now been under observation for fifteen months, no change has been noticed. There is no doubt, however, that the local condition appears to vary from time to time, the infiltration appearing to be reduced and the surface colouring somewhat modified at one visit while at the next the parts again tally with the description originally made. Even after a prolonged period of ten and fourteen years neither ulceration nor cicatrization can be demonstrated.

Histological examination reveals a similarity of structure. The general characters common to all are to be found in the normal, intact epithelium, in the finely fibrillar network of connective tissue, which, associated with some œdematous infiltration, is responsible for the increased thickening of the parts. Collections of small cells, mostly of mononuclear and polymorphonuclear types, are found in relation to the surface epithelium, to the gland acini and blood-vessels. The mucous glands show no change and the walls of the arterioles are not thickened. There is no evidence of tubercle, syphilis or rhinoscleroma, and no specific micro-organisms have been detected.

There does not appear to be any specific line of treatment. The condition has not been improved under mercury and potassium iodide. I have not experimented with salvarsan. Arsenic and iron have had no obvious effect. Thyroid treatment did not diminish the infiltration in my second case, though the patient felt generally better while taking it. In the light of the general and local improvement following the vaccine treatment suggested by Macintyre in my first case a further trial with vaccines might be made in other cases of a similar nature, though too much importance must not be attached to this therapeutic measure, seeing that spontaneous disappearance of the hyperplasia occurs from time to time in these cases.

It is obvious, therefore, from a consideration of the six cases reported by Brown Kelly, Semon and myself, that we have to deal with a pathological condition of the fauces, pharynx and larynx, which cannot be placed in the category of any of the hitherto well-recognised diseases affecting this part of the body. Brown Kelly, in his paper, discussed the respective claims of rhinoscleroma, tertiary and hereditary syphilis, but in the absence both of clinical and histological evidence confirmatory of any of these conditions he was obliged to reject in his case any such diagnosis. He pointed out, however, that the condition might be analogous to the

affection known as subglottic hypertrophic laryngitis, and demonstrated that the clinical history, the appearance of the infiltrations and their histological changes presented many points of resemblance in the two affections. Semon, in discussing the possible ætiology of these rare cases, is disinclined to accept their identity or analogy with hypertrophic subglottic laryngitis, and prefers the application of the term "chronic hyperplasia" as descriptive of the condition which we have been discussing until more light is thrown upon its ætiology.

I do not think that any fresh light has been thrown on this by a study of the additional case now published. The impression of incipient myxœdema which was suggested by the facial expression of the patient had to be abandoned after three months of thyroid treatment, and there is no evidence in the other cases to support this view. The possibility of a septic origin must not be lost sight of. Semon, in discussing the ætiology of the condition, regarded my first case as differing from Brown Kelly's and his own on the ground that it was probably the result of an acute septic infection, the obstructive symptoms coming on suddenly and demanding tracheotomy. As no previous examination of the throat had been made in this case, it is impossible to say whether the peculiar appearances afterwards observed owed their origin to this attack, or whether the acute obstruction was due to an inflammation superimposed upon an already existing hyperplasia. The occurrence of a second acute obstructive attack seven years later and almost as severe as the first seems to furnish evidence in favour of the latter view. Kelly's patient had been subject to slight attacks of sore throat for eight years, and one of Semon's cases had had long-standing throat trouble. When we recall, however, the frequency with which the throat is the site of septic infection and the rarity of the condition now under consideration, it is difficult to associate its origin with a septic basis. Nor does the improvement in one case under vaccine treatment furnish conclusive evidence of its origin, because both improvement and cure have resulted without any treatment being employed.

It will not be out of place to conclude by quoting from Mr. Shattock's report on the histological examination which he made from the tissue removed from one of Semon's cases. "The examination shows no more than the anatomical character of the condition—it does not demonstrate its cause. The lesion presents none of the structural features of tuberculosis, syphilis or rhinoscleroma. The overgrowth of connective tissue has no relationship

with a neuro-fibromatous pachydermia since the nerves are not involved in the general fibromatosis. The enlargement, again, is not due to a dilatation of lymph-spaces as in a lymphangiomatous or lymphangiectatic lesion. Nor does it bear relegating to the group of angio-neurotic œdemas observed in the skin, since the lesion was not sudden either in its onset or at any time in its rate of extension. The complete absence of chronic arterial change further removes any relationship between the disease and erythromelalgia, seeing that in the cases of the last-named condition which have been histologically examined local arterial disease has been observed."

REFERENCES.

- A. BROWN KELLY.—*The Lancet*, April 6, 1901.
 SIR FELIX SEMON.—*Trans. Lond. Lar. Soc.*, November, 1902.
 J. DUNDAS GRANT.—*Ibid.*, February, 1903.
 H. LAMBERT LACK.—*Ibid.*, March, 1903.
 A. LOGAN TURNER.—*Ibid.*, January, 1904.
 SIR FELIX SEMON.—*The Lancet*, February 25, 1905.
 C. W. M. HOPE.—*Proc. Roy. Soc. Med.*, Sect. of Laryngol., December, 1912.

NOTE ON A TUMOUR OF THE SOFT PALATE CONSISTING MAINLY OF SALIVARY GLAND TISSUE.

By THOMAS GUTHRIE, M.A., M.B., B.C., F.R.C.S.,
 Hon. Laryngologist to the Liverpool Royal Infirmary; Hon. Aurist and
 Laryngologist to the Victoria Central Hospital, Liscard.

With a Pathological Report by PROFESSOR ERNEST GLYNN,
 Professor of Pathology in the University of Liverpool.

THE following case appears to me worthy of record in view of the remarkable structure of the growth:

E. R—, a boy, aged eight, was brought to the Throat Department of the Liverpool Royal Infirmary by his mother, who stated that adenoids had been removed about eighteen months previously at another hospital, but the boy still did not appear to breathe freely through his nose. On examination it was found that no adenoids were present, but a somewhat pear-shaped mass, the size of a small bean, was seen hanging from the soft palate about one eighth of an inch to the right of the uvula. The growth was covered with normal mucous membrane similar to that of the surrounding parts, and showed no signs of ulceration. The narrow

upper end or pedicle appeared to be attached to the posterior surface of the soft palate immediately above its lower margin. The rounded lower end hung down below the level of the tip of the uvula.

The loop of a snare was passed over the growth, and its pedicle—which proved to be considerably tougher than was expected—severed from its attachment to the palate. Bleeding was practically absent.

The tumour was submitted for microscopical examination to Prof. Ernest Glynn, who reported as follows :

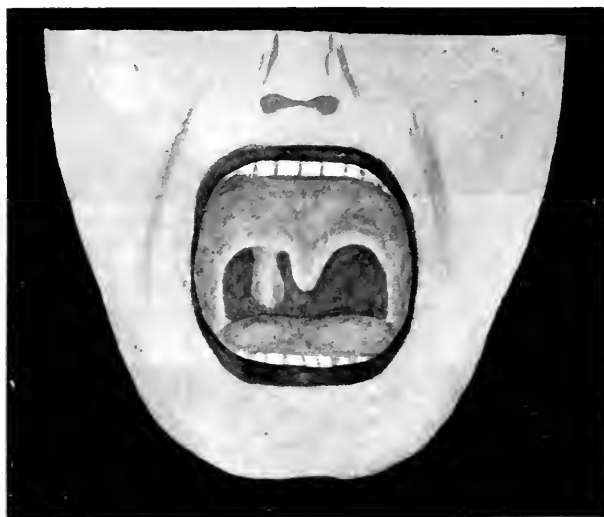


FIG. 1.

REPORT BY PROF. ERNEST GLYNN.

The tumour is pear-shaped, and measured, when cut through the middle, 9 mm. longitudinally and 6 mm. transversely. It mainly consists of a mixed salivary gland of the submaxillary type.

The surface of the tumour is covered with squamous epithelium, on to which the mouths of several small ducts lined by columnar epithelium open. Underneath the squamous epithelium there is a thin layer of fibrous tissue, in places containing nodules of typical lymphoid tissue, the largest being 30 μ deep.

The salivary tissue resembles exactly that of the normal human submaxillary, except in the following details:

- (1) It is divided into small lobules separated by fairly dense

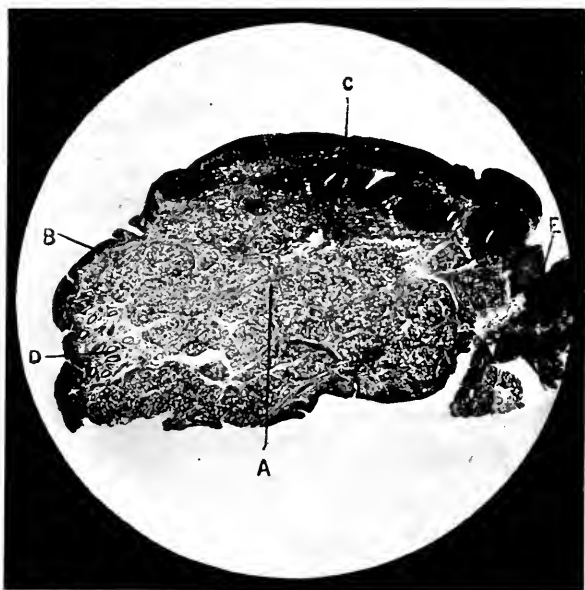


FIG. 2.—Section through the whole tumour magnified five times. (A) Lobulated salivary gland. (B) Superficial squamous epithelium. (c) Layer of lymphoid tissue with two ducts. (d) Mass of small ducts. (E) Stalk of tumour.

(From a microphotograph prepared in the Pathological Department of Liverpool University.)

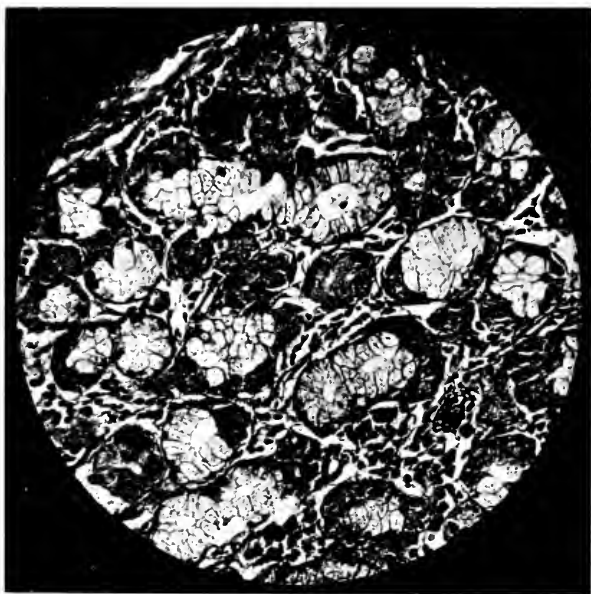


FIG. 3.—Section of a part of the tumour magnified 200 times.

(From a microphotograph prepared in the Pathological Department of Liverpool University.)

bands of fibrous tissue, and the delicate periacinous stroma is infiltrated with lymphocytes and plasma-cells.

(2) The acini consist mainly of mucous cells; serous cells are very scanty, but the demilunes of Heidenhain are unusually numerous.

Most of the ducts open by separate orifices at the apex of the tumour; some can be seen penetrating the lymphoid tissue.

The tumour has evidently originated from a "rest" of salivary gland deposited in the palate during foetal life.

Owing to its position, the tumour has been irritated, as indicated by the infiltration of the periacinous tissue with lymphocytes and plasma-cells.

So far as I have been able to examine the literature, I have not discovered any record of a similar case. As stated in Prof. Glynn's report, and clearly shown by the accompanying plates, the growth consists for the most part of typical salivary gland tissue. It therefore bears no relationship to the so-called "mixed parotid" tumours, a number of which have been described in connection with the palate, since these tumours do not contain salivary gland tissue, and are, in fact, endotheliomata.

SUSPENSION LARYNGOSCOPY IN CHILDREN, WITH PARTICULAR REFERENCE TO THE TREATMENT OF PAPILLOMA.¹

By W. ALBRECHT,
Berlin.

OPERATIONS on the larynx have been materially facilitated by Killian's suspension laryngoscopy. This is particularly true of operations on children, in whom endolaryngeal treatment is always so difficult that every improvement in technique is of the greatest importance. There is no need to describe in detail the general technique of suspension laryngoscopy, especially as the procedure is much simpler in children than in adults. The reasons for this are to be found partly in the upright position of the epiglottis, which often permits of a satisfactory view as soon as the base of the tongue is pressed upon, and partly in the slender build of the neck characteristic of childhood. A gracefully moulded, easily movable neck is naturally one of the most important conditions for

¹ Read at the Verein deutscher Laryngologen, Stuttgart, May, 1913.

the safe and easy performance of suspension laryngoscopy, seeing that the more slender the neck is, the further can the head be bent backwards, and the more the head can be extended the more securely does the instrument rest. The narcosis is the only unpleasantness, and this objection is not limited to suspension laryngoscopy, since chloroform must be resorted to in all major manœuvres in the child's larynx.

Clinically the procedure has rendered more certain :

- (1) The removal of the larger "infantile nodes."¹
- (2) The operative treatment of laryngeal tuberculosis.
- (3) The operative treatment of papilloma.

To these three I may add a fourth, enucleation of the tonsils, although, strictly speaking, it belongs rather to suspension pharyngoscopy than to suspension laryngoscopy. In operating under narcosis and with the head dependent suspension gives a first-rate view of the tonsillar region, so that enucleation can be effected in a few minutes under the strictest visual control.

Of its use in the treatment of "screamer's nodes" all we need say is that we thereby obtain an easy access to the field of operation, and are able to remove them from their situation with precision.

In treating tuberculosis, on the other hand, we must premise our remarks by observing that we do not treat every case of laryngeal phthisis in children endo-laryngeally, for we await the effects of the constitutional treatment of the disease before resorting to any local treatment. It is only when there are signs of dyspnoea that we adopt endo-laryngeal measures. Two cases of this kind have come under our care. In these the laryngeal lumen was reduced by granulations and infiltration to a small slit. The diseased tissues were removed with the double curette, and since that time, several months ago now, both children have been able to breath quite freely.

But this power of operating thoroughly is not the only advantage. Another very favourable circumstance lies in the fact that we can now operate with greater safety. In all stenosing laryngeal disease, as everybody knows, we must always be apprehensive of a sudden attack of asphyxia during operation. With suspension laryngoscopy once the spatula is properly in position any such danger is quickly got rid of, for the extended position of the head at once enables us to pass a straight tube right into the trachea

¹ "Infantile nodes" (*Kinderknötchen*) on the cords are analogous to the "singer's nodes" of adult life. They are ascribed to habitual crying or screaming in children. They, therefore, might be termed "screamer's nodes."—*Trans.*

and so to perform a kind of direct intubation. For this purpose Killian's infantile tube is specially well fitted, the mandrin of which easily finds its way among projecting infiltrations. I was able in two cases to persuade myself of the truth of this remark; there was no asphyxia, certainly, but the experimental introduction of the tube was adopted for prophylactic reasons.

The great field for suspension laryngoscopy, however, is in the treatment of papilloma. Here its advantages are most apparent. The area of operation lies peaceably before our eyes. We have both hands free. The left hand can be used to mop up the bleeding while the right is in action, or with a sound in the left hand we hold aside folds of mucous membrane, the ventricular bands, or the vocal cords, and so are able to carry out a searching scrutiny of the various parts.

To come to detail, we set about the operation as follows: First of all the larger papillomatous masses are removed with a fine double spoon-forceps; then the projections which remain are smoothed off with the double curette. When once the laryngeal lumen has been freed particular attention is paid to the ventricles of Morgagni and to the subglottic space, since in these regions remnants of papillomata are still discoverable. Finally, I pass a simple curette over the whole mucous surface of the larynx. I should like particularly to recommend this simple curettage. We can easily note how with gentle pressure the still diseased mucosa can be scraped away while the healthy tissue offers resistance and remains behind. I have on several occasions been surprised to find how much papillomatous mucosa there was to be removed with the curette, and that this tissue is actually diseased can easily be proved by histological examination.

So far I have treated in this way nine papillomatous children. The results to date are: Two children are still under treatment, for, in spite of two operations, they keep showing recurrences. In both of these cases the larynx was filled with papillomata and the upper half of the trachea was also affected. Both of the children are, of course, wearing a tracheotomy tube, and to some extent we may attribute the continuing recurrences to this fact. It is frequently possible to observe that the irritation of the tube encourages the growth of papillomata in its neighbourhood, and that from the moment the tube is dispensed with, they manifestly retrogress.

Of the seven remaining children one has remained free of any recurrence for ten months; two for seven months; three for six months; and one for four months. In three of the cases a single

operation proved to be sufficient; in the others, further intervention was necessary, but none have required more than four operations. Three of the seven cases are of particular interest as they provide us with a comparison with the older procedure—operation through the tube spatula. The first case, a girl, aged nine, had been under treatment in the clinic for a year. To begin with, the whole of the laryngeal space was filled with papillomata, looking like a cauliflower in the larynx. With the tube spatula they were again and again removed as thoroughly as possible at different times, but every time the spatula was inserted the larynx showed itself full of papillomata. After the first clearance under suspension laryngoscopy the lumen remained free, so that we were able, for the first time for several years, to dispense with the tracheotomy tube. Six weeks later a few small warts had to be removed, but this was the last time. Since then, ten months ago, there has been no sign of any recurrence and the voice has become quite clear.

With the other two children we are able to record the same result. In one of them, a boy, aged four, the case was complicated by papillomata in the trachea as far as the bifurcation. Since the fourth intervention in this case, seven months ago, the larynx and trachea have remained free of disease.

The time during which the treatment has been under observation is, of course, too brief to permit of a conclusive decision being arrived at, and I am quite well aware that a recurrence of papilloma may set in after an interval of years. At the same time our present experiences justify a more favourable prognosis than was formerly possible. A year ago my views on the treatment of papillomata were pessimistic. Since we have taken up suspension laryngoscopy I have become an optimist. D. M. (*trans.*).

CLINICAL NOTE.

A METHOD OF DEALING WITH SEPTAL PERFORATIONS.

By W. J. HARRISON, M.B.,
Newcastle-on-Tyne.

SOME time ago, when doing a submucous resection on a boy for a marked deflection of the septum, I unfortunately tore both flaps immediately opposite to each other near the floor of the nose. The gap left was such that drawing the edges together was out of the question, and a perforation appeared inevitable. A fairly large piece of cartilage which

had been removed was trimmed to a size somewhat larger than the perforation, and then inserted between the flaps so that it closed the opening. The nose was then packed with Hill's absorbent splints previously smeared with vaseline, and these were carefully removed twenty-four hours later. The edges of the tear granulated over the cartilage, and in a short time there was no sign of any perforation having taken place.

At the time I did not know that this proceeding had been done before, but I have lately read an article by Dr. Perry G. Goldsmith,¹ of Toronto, in which he mentions doing the same thing with satisfactory results. As he says that so far as he knows the method is original, others may not have tried it, therefore I record the above case.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

November 21, 1913.

MR. RICHARD LAKE, *President, in the Chair.*

A New Eustachian Bougie.—W. H. Kelson.—The instrument consists of a sliding scale to which the bougies are attached, and it is so arranged that the distance which the bougie projects beyond the end of the Eustachian catheter is automatically marked on the scale. The instrument, including the bougies, is made entirely of metal and so is easily sterilised by boiling; but bougies of gum-elastic or other material can be used if desired.

The PRESIDENT said the instrument was an ingenious one, and it was easily sterilisable, whereas a gum-elastic one was not.

Dr. FITZGERALD POWELL said he was interested to see the instrument, as he thought the bougie for this purpose was a thing of the past. He had not encountered cases which required the use of a bougie, though Dr. Kelson seemed to have had such to treat. There must be only a small proportion of cases in which it was impossible to secure the patency of the tube through the catheter. There was probably not much danger in the use of the instrument in experienced hands if employed very carefully. It certainly was not an instrument for promiscuous use.

Mr. SYDNEY SCOTT had found the bougie very useful in a few selected cases—*i. e.* to clear a temporary obstruction such as thick mucus, and so thus removing an obstacle to inflation. He would be a little afraid to use such fine bougies as Dr. Kelson had shown because of the risk of making false passages.

Dr. H. F. MOLE also expressed the fear that such a fine bougie might cause injury. Some cases admittedly were improved by the passage of a bougie, specially perhaps those which were improved by politizerisation but in which this improvement was very temporary.

¹ Perry G. Goldsmith, M.D., "The After-treatment of Nose, Throat, and Ear Operations," *JOURN. OF LARYNOL., RHINOL., AND OTOL.*, December, 1912.

Dr. KELSON replied that he would like to know what members would do when, being satisfied that they had got the catheter in the right position, they found they were unable to get a satisfactory result, owing to the interposition of something, such as a plug of mucus. His instrument provided a means of removing such obstruction. When emphysema was caused it was because the instrument was not in the right place, but had perforated, not the tube, but the adjacent soft tissue. Metal catheters without any bougie were liable to do this occasionally.

Lateral Sinus Thrombosis, with Pyæmia.—F. F. Muecke.—The patient, a male, aged forty-six, was sent to the London Hospital from the Eastern Fever Hospital, into which place he was admitted two days previously as a case of typhoid fever. The history commenced nine weeks previously with severe earache on the left side, which was quickly followed by a discharge. The discharge was maintained for seven and a half weeks, when it suddenly stopped and the patient was seized with what he took to be a bilious attack—headache, malaise, nausea, etc. The attack gradually increased in severity, and at the end of eight days he was sent to the Fever Hospital, where he developed stiffness and pain on the left side of the neck.

On admission his temperature was 102.5° F., pulse 100. He was obviously extremely ill, but complained of nothing except the pain in the neck. There was no headache, no nausea or vomiting, no mastoid redness or tenderness, and no auricular displacement. A bead of pus was seen coming through a small perforation in the upper half of the drum, and there was redness and cedema at the upper posterior angle of the bony meatus. The neck presented a diffuse red, tender swelling along the course of the internal jugular vein. No definite history of a rigor could be obtained, only obscure shivering attacks. An examination of his blood showed an increase in the polynuclear neutrophiles and large hyaline cells, and a pure culture of streptococci was obtained from a finger puncture. The cerebro-spinal fluid was normal.

At the operation the lateral sinus at its bead was found to be gangrenous, and the vein was thrombosed from almost the torcula to the innominate vein. The internal jugular was ligatured below the clot and the upper part dissected out and stitched to the upper angle of the incision. The facial vein, being partly thrombosed, was also ligatured. The sinus was syringed through from above, much clot being thus removed. The clot in the upper part of the sinus was also removed. The clot was found to be teeming with streptococci. The patient made a good recovery, but on the second day slight facial paralysis was seen, which became absolute on the fourth day.

An examination of the blood a week after operation still showed streptococci, but the patient was doing well, except for an evening rise of temperature to 102° F. A vaccine was injected three days after the operation, and on five other occasions, a high rise of temperature being taken as an indication. Ten days after the operation the blood was reported to be sterile. Twelve days later the left leg became swollen and painful, and it was found that the popliteal vein was thrombosed. Four days later a similar condition was seen in the right leg. Ten days later the patient complained of great pain over the right kidney, and blood and pus were seen in the urine on the next day. Cystitis quickly developed, followed by left epididymo-orchitis. Four days later symptoms of acute peritonitis appeared, and a laparotomy was performed by Mr. Warren. On recovering from the operation the patient slowly began

to mend, and was sent to the seaside fourteen weeks after the first operation.

The temperature charts show an average evening rise to 102° F. during the first seven weeks, to 100.5° F. during the following five weeks, and a practically normal temperature the last two weeks.

The PRESIDENT remarked that an unusual feature was the large swelling in the neck, owing to the abscess involving the internal jugular vein.

MR. SYDNEY SCOTT had never seen such a severe case of true pyæmia recover. The fact that there was peritonitis, too, must be almost unique.

MR. G. J. JENKINS asked whether Mr. Muecke looked upon the condition as septicæmic, not pyæmic. There seemed, from the description, to have been a general infection of the blood-stream. There was undoubtedly a great variation in the resistance of individuals to streptococcus infection. He remembered a case in which a child had injured his tongue with a piece of wood: streptococci could be grown from the blood of the child for five weeks after the accident. Death ultimately resulted from uræmia.

DR. KELSON asked whether the vaccine given was autogenous, and whether Mr. Muecke attributed any large part of the recovery to it.

DR. FRITZGERALD POWELL said it was very interesting to note the point mentioned by Mr. Jenkins, viz. how long these cases would sometimes go on without showing alarming symptoms. Some time ago he was asked to see a case in which the patient was thought to be suffering from rheumatism, and had been treated for such for some weeks. She did not look alarmingly ill. There was a history of suppuration in the ear, and at the time he saw her she showed head symptoms and had a pyæmic abscess in the right knee. Operation exposed the lateral sinus thrombosed by septic clot, which extended to the opposite sinus. The patient died, and the lateral sinus, straight sinus, petrosal and cavernous sinuses were found thrombosed—and the petrous bone necrosed.

MR. MUECKE, in reply, said that of eighty cases at the London Hospital, the abscess which had been referred to occurred in only four, and they were all, like this one, late cases. It was agreed that the case was one of septicæmia as well as pyæmia, as shown by the sections of blood-clot and sinus wall: blood was taken from the top of the vein, and from the basilar vein, and streptococci were found. The later blood examinations were taken from finger punctures, so as to avoid further distress to the patient, already so ill. The vaccine employed was an autogenous one, and was given very soon afterwards. It had a very definite result. It was given six times in all, and each time the temperature promptly came down. The indication for giving the vaccine was an exceptional rise of temperature. He went through the *post-mortem* books for Mr. Hunter Tod, who was working on these cases, and he found that most of the cases found *post-mortem* to have died of sinus disease in the medical wards had been registered as typhoid fever cases. The next mistake in order of frequency was a diagnosis of lung trouble. Facial nerve trouble after the operation, even though that nerve was not touched, was perhaps due to the after-plugging.

Lateral Sinus Thrombosis and Paralysis of External Rectus.
—F. F. Muecke.—F—, aged fifteen. Five days' history of severe headache, malaise, and nausea; two rigors; paralysis of external rectus of

same side noticed the day before admittance. No mastoid redness or tenderness. Case very similar to that above. At the operation the vein was found thrombosed from near the torcula to the common facial junction. The operation was conducted as in the previous case. The sinus was gangrenous at the bend. The patient made an excellent recovery, except for an acute synovitis of the elbow. On leaving for the convalescent home there was a slight recovery noticed in the external rectus. It was on account of the peculiar association of sinus thrombosis and external rectus paralysis that the exhibitor showed the case.

The PRESIDENT said a point worth considering in this case was the paralysis of the external rectus. Sometimes it occurred in children without there being involvement of any structure beyond the mastoid region. It was also sometimes found in association with labyrinth trouble and cerebral abscess.

Mr. G. J. JENKINS said he had not seen many cases of external rectus paralysis, and the cases of it he had seen were mostly associated with acute mastoiditis. The first time he encountered this condition he consulted Dr. Urban Pritchard, who said it would do well if a mastoid operation were done. He asked Dr. Pritchard how long the condition would remain after operation, and he said a fortnight. This prognosis proved to be correct. He had been in the habit of explaining it by the focus of irritation in the mastoid giving rise to an increased blood-flow to the external layer of the dura, on the posterior surface of the petrons, thereby causing a thickening, which might be only slight, but sufficient to nip the sixth nerve on its passage through its small aperture. It was one possible explanation. In all his cases of acute mastoiditis associated with external rectus paralysis the external rectus had recovered.

Mr. SYDNEY SCOTT was interested in the paralysis of the sixth nerve. The early cases of this complication which he had particularly noticed had been associated with infections of the internal ear, and he had presumed without pathological evidence that the paralysis was due to the infection spreading from the labyrinth to the meninges direct to the sixth nerve. This supposition was upset by a case of pneumococcal serous meningitis which recovered without involvement of the internal ear, and he had seen other cases of serous meningitis which had succumbed with sixth nerve paralysis without inflammatory involvement of this nerve. The experience gathered at the National Hospital, Queen Square, led him to say that the most important factor appeared to be increased intra-cranial pressure, to which the sixth nerve was the most vulnerable. Sometimes one, sometimes the other sixth nerve was paralysed, although neither nerve was directly involved in the lesion which caused the increase of intra-cranial pressure. He had come to agree with the explanation advanced by the neurologist, that transient paralysis of the sixth nerve was generally due to increased intra-cranial pressure and nipping of the nerve as it passed through the dura mater, without there being any inflammatory change of the dura mater or of the nerve itself. It was noteworthy that in Mr. Muecke's case headache was severe.

Dr. URBAN PRITCHARD said that in the light of his old pathology, which in so many respects was being altered, he attributed these cases to localised meningitis, including congestion at the site. He had not noted that these cases specially had severe headache, indicating the presence of increased pressure. Practically they invariably recovered after the mastoid operation, the congestion or localised meningitis being relieved by the depletion and counter-irritation.

Mr. MUECKE, in reply, said he had not previously noticed the associa-

tion mentioned in the notes, and he thought if he brought it forward it might deter others from opening the dura. In neither of the cases was there any outward sign of antrum disease: the hardest pressure did not reveal mastoid tenderness.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

November 7, 1913.

DR. D. R. PATERSON, *President of the Section, in the Chair.*

Cases of Foreign Body in the Bronchus, illustrating Points of Interest.—D. R. PATERSON.—(a) *Piece of Button removed from Left Bronchus.*—A girl, aged ten: admitted to hospital, May, 1913. She was said to have inhaled a small piece of button which she had in her mouth. Beyond a slight occasional cough there were no symptoms, and the child looked well. X-ray examination was negative. Though symptoms were absent, the child gave such an intelligent account of what happened that it was decided to explore the air-passages. In the left bronchus, wedged in the branch to the upper lobe, was seen a small, dark body. As the bronchus was small, only a narrow tube was practicable: the fine, telescopic forceps drew it out, but in passing through the glottis it slipped from their grasp. Fortunately it remained impacted in the subglottic space and was easily removed with the crocodile forceps. The body was a wedge-shaped piece of a black coat-button, $\frac{3}{8}$ in. in size.

(b) *Piece of Mutton-Bone impacted in Right Bronchus.*—The patient, aged thirty-two, admitted July, 1913, was a hospital nurse, who gave a history that, three weeks before, whilst eating mutton broth, she felt a piece of bone "go down the wrong way." There was choking at the time, which soon passed off, and, beyond an indefinite uneasiness about the chest and an occasional cough, there was a total absence of symptoms. She looked well, had no rise of temperature, and had done her work regularly. Though there were no auscultatory signs, she was "certain it was still there." Accordingly she was placed under a general anæsthetic, and at the bottom of the right bronchus was found a piece of flat bone $\frac{3}{8}$ in. square. Its sharp edges followed the long axis of the wall of the bronchus, allowing the air to pass freely to and fro. Beyond a slight injection of the mucosa in the immediate neighbourhood there was no sign of irritation, though the bone on extraction had a very foul odour.

(c) *Feather, 6 in. long, in Trachea and Right Bronchus.*—A woman, aged forty-seven, admitted July, 1913, had worn a tracheotomy tube for two years on account of syphilitic laryngeal stenosis. She was in the habit of cleaning the tube by pushing down a long feather, and whilst doing this a portion broke off and could not be recovered. She came to hospital fifteen hours later, looking very ill, with dyspnoea and wheezing. An attempt to lie down brought on much distress. A bronchoscopic tube was passed through the tracheal opening, and after clearing the profuse secretions which filled the trachea, the feather was seized and drawn out of the right bronchus. It was 6 in. long and was very

offensive. The mucosa of the trachea and bronchus was covered with a dirty grey coating, the lumen being filled with frothy secretion. The patient was very ill for a few days with bronchitis, but afterwards did well.

These cases illustrate (1) variations in the degree of irritation set up by a foreign body in the bronchus. The first two patients had practically no symptoms, and a very clear account in each was the only ground for interference. Even a very septic piece of bone may be tolerated if it does not obstruct the airway or imprison secretions. On the other hand, the third case shows how serious a condition may be readily produced by a septic body. (2) In the first case there was a not uncommon accident in the course of extraction—slipping of the foreign body from the forceps. This is sometimes attended by serious consequences when it falls into the other bronchus. It is a practical problem how best to prevent it.

Removal of a Green Pea from the Right Bronchus by an improvised Method.—Herbert Tilley.—On August 6, 1913, I was asked to see a man, aged sixty-three, who had suffered from a harassing cough for three days. He said he was eating some peas when one "went the wrong way." Examination of the lungs revealed slight dulness on percussion over the lower half of the right lung posteriorly; breath-sounds and vocal resonance were diminished over the same area.

The lower pharynx, larynx and upper tracheal regions were anaesthetised with a 20 per cent. solution of cocaine. The bronchoscope was passed into the right bronchus, and, when a quantity of mucus was removed, the pea could be easily seen impacted at the end of the main bronchus. Fearing it would be very soft and macerated, I did not attempt to remove it with forceps or hooks, but passed the end of the bronchoscope firmly on to the pea and then slowly passed a well-fitting plug of wool soaked in liquid paraffin down the bronchoscope until it reached the foreign body. Then, by a sudden but short movement of withdrawal of the piston-plug, the pea was sucked into the lower end of the bronchoscope and removed together with the tube.

It is well known that foreign bodies such as nuts, peas, beans, corn-seeds, etc., which quickly soften and macerate, are peculiarly dangerous when they enter the lower air-passages, and are equally difficult to remove. The method above described seems worthy of report.

The PRESIDENT added that an interesting case had been reported by Hinsberg, in which a plum-stone had got lodged, in the first instance, in the right bronchus. It was seized without difficulty, but in the act of extraction it slipped from the forceps and dropped into the left bronchus. The patient got into a serious condition, and though the stone was seen and grasped it could not be moved, and the woman died some hours later. At the autopsy it was found that the right lung had been entirely shrunken for many years, the patient using practically solely the left lung, which had become blocked up by the entrance of this foreign body. A foreign body obstructing a bronchus soon abolishes the respiratory function of that lung, and consequently if it happened to slip from the forceps in the course of extraction it was more than likely to be drawn into the bronchus of the sound side. Brünings had suggested that before attempting extraction, a "bronchus protector"—a small arrangement like a sweep's brush—should be placed in the unaffected bronchus, so that if the foreign body happened to slip from the grasp of the forceps it would be prevented from entering it.

Mr. WESTMACOTT gave an illustration of the importance of paying attention to the statement of the patient. Two years ago a lady was having teeth removed in a dentist's chair, and on recovering from the anæsthetic she said she felt there was something in the windpipe. Upon examination he found nothing there. She did not appear to have irritation or cough, but persisted in her statement that there was something present. On being radiographed no foreign body was seen by screen or plate. Ten days ago, however, she brought a bicuspid root, with the crown detached, which she had coughed up that morning. There had been an attack of pain, and a violent coughing fit resulted in it being brought up.

Dr. JOBSON HORNE said that not only had suction action been resorted to for the extraction of foreign bodies, but some eight years ago a writer suggested the application of some adhesive matter to the end of the piston plug to prevent, if possible, the foreign body slipping away and, perhaps, lodging in another bronchus.

Dr. H. J. DAVIS wondered that soft foreign bodies, such as peas and beans, required so much expiratory effort to cough up, unless they happened to be in one of the large bronchial tubes. This did not apply to those of firmer texture. Such things as needles and steel pins when in the œsophagus were often difficult to find, and hence it had occurred to him to have for such cases a slender rod of iron highly magnetised, and to have the extracting forceps magnetised also. This should greatly diminish the risk of relinquishing the foreign body after once having located and grasped it. Sometimes, though a needle or a pin could be seen by X rays, it could not be found because a fold of mucous membrane enwrapped it. The patient's statement as to the presence of a foreign body could not always be accepted, as illustrated in a case of his. The patient gave a history of having had a foreign body, a pin, in the lung fourteen days. The girl had urgent dyspnoea and seemed very ill. She was taken in and skiagraphed, but without result. Something about the child's appearance made him think of diphtheria and there was found to be albuminuria. On looking into the larynx with the laryngoscope he found no indication of diphtheria, but on passing a bronchoscope he found trachea and bronchi filled with diphtheritic membrane. This was peeled off by the advancing tube and bled profusely. The pathological report was that it was not diphtheria, but the girl is still in the hospital with diminishing knee-jerks, a rapid pulse, and paralysis of the palate, and, clinically, there was no doubt whatever as to the case being one of diphtheria. The passage of the tube gave permanent relief to the retraction and dyspnoea.

Dr. LAMBERT LACK agreed that the greatest respect should be paid to patients' statements. In the case of adults a definite history of a foreign body could usually be relied on. Alleged fish-bones could not always be found, but it did not follow that they were not there. Some years ago a patient came to him with a tooth-plate and teeth attached firmly embedded into the larynx, yet there were practically no symptoms, or so few that the local medical man had sent her away for a change to the seaside to get rid of a slight sore throat. He thought Mr. Tilley's explanation of his case was probably wrong; the piston action did not seem likely to have had anything to do with it; the end of the tube was probably jammed on to the pea, and it was secured in that way.

Dr. DONELAN also thought the reason such soft bodies were not coughed up was chiefly physiological. The body was probably first held by spasm, then there was swelling of the mucous membrane followed by

absorption of the air in the alveoli supplied by obstructed tube, hence there would in addition be no *vis à tergo* on coughing.

Sir STCLAIR THOMSON said he was surprised to hear that rubber did not show up on the X-ray plate. Last year he had a case in which a vulcanite denture had been lodged in the œsophagus for two and a half years. It had been X-rayed at several Metropolitan hospitals, but they had failed to find it: even with the œsophagoscope it was not found. On the skiagram made for him, however, it showed sufficiently plainly for those skilled in reading skiagrams. Morals could be drawn from these excellent cases, and one of them was that there was no great need for hurry about extraction in certain cases. Knowledge of this fact would do much to obviate the tempestuous attempts at removal sometimes made by practitioners, who were without the special apparatus; and there was time to take the patient to a hospital, or to someone experienced in such matters. This rising generation might well be reminded that in former days the death-rate from the lodgment of foreign bodies in the bronchi was 60 per cent. if operation was not done—and the only operation available in those days was tracheotomy, which reduced it to 30 per cent. Nowadays the figures were probably from 1 to 3 per cent.

Mr. TILLEY, in reply, said that in difficult cases it was very valuable to have a screen examination to guide one in the extraction. In certain instances he thought the invisibility of the foreign body in the lung or bronchi was due to an instantaneous radiogram not having been taken. In answer to Dr. Lack, the foreign body was not attached to the end of the tube, but the suction had drawn it some way up the tube.

The PRESIDENT, in reply, said that when confronted with a soft foreign body in the bronchus he always had some anxiety. He remembered a case in which a piece of bean had been there some time, and was much macerated. Though he got hold of it without much damage, he realised what might happen if it slipped and dropped into the healthy bronchus. In reply to Dr. Hill, he did not think one should rely too much on the X-ray photographs. On the other hand, sometimes bodies which were shown on the X-ray plate were very difficult to find with the bronchoscope, and recently Prof. Kilian showed him a case which had been in his clinic for some time, and in which repeated attempts had been made to find a foreign body which the radiograph showed. In these attempts with the bronchoscope it was important not to prolong the *séance* too much, for that added to the risks.

Notes, Specimen and Drawing of Case of Cerebro-spinal Rhinorrhœa, with subsequent Ethmoiditis, Mucocœle, and Frontal Sinus Suppuration, indistinguishable from Ethmoidal Mucocœle; Operation; Death.—P. Watson-Williams.—See JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, vol. xxviii, p. 623.

Mr. SOMERVILLE HASTINGS said that early in the present year he had had a somewhat similar case. A woman came to hospital complaining that, eight weeks before, she had had much pain in the neighbourhood of the right eye, associated with fever, and that a swelling then developed. The right globe was pushed outwards, and there was a large, tense, fluctuating swelling to the inner side of the right eye. He punctured this, and drew off dark-brown thick fluid, which bacteriological examination showed to be sterile. By feeling about in the cyst with the end of the needle he found there was a communication with the frontal sinus. He operated, and as the septum was much deflected, he did a submucous

resection. The right middle turbinate was then seen to be glued down to the outer side of the nose, and when he removed it a large quantity of the same dark-brown fluid came out, and a probe passed easily into a thick obliterated frontal sinus. The patient did well for two days, and then suddenly developed meningitis, and died on the fourth day. At the autopsy there was no injury to the dura, but the pressure of the fluid had caused absorption of long walls of the frontal sinus, so that the mucous membrane of the sinus was in contact with the dura. The meningitis was most marked at the base of the brain and was almost entirely absent in the frontal region.

SIR STCLAIR THOMSON, in his book on the cerebro-spinal fluid, had referred to a case published in full by Mermoud. There a very similar occurrence took place, and the author regretted he did not collect the fluid. At one time it was thought that cerebro-spinal rhinorrhœa affected only young people, but cerebro-spinal rhinorrhœa had been proved in patients up to sixty-five years of age; it might occur at any age and in either sex. All the published cases had ended fatally. He had collected reports of twenty-three. When there was sinusitis the slightest touch, though the instruments were aseptic, appeared to set up fatal meningitis.

MR. CLAYTON FOX asked whether the pyrocatechin reaction had been tried.

THE PRESIDENT asked whether, if the nature of such a case were known beforehand, one should abstain from operating. His question was founded on Sir StClair Thomson's remarks.

DR. WATSON-WILLIAMS replied that no opportunity occurred for collecting the fluid and examining it. He did not suspect cerebro-spinal rhinorrhœa before operating, and no pus was observed in connection with the discharge of fluid, and he had regarded the "clear fluid" as simply mucus. From the examination of the specimen he concluded that the dehiscence was congenital: there was a large area of dura mater exposed. He first of all opened what he at first thought was the ethmoidal mucocele, but when he found suppuration in the frontal sinus, he was proceeding to do a Killian, when he found that the raspatory in elevating the periosteum was not against the bony orbit, but in contact with the membrane where it was exposed in the roof of the orbit. In the specimen a small round pin-point opening existed during life, and had a perfectly even margin. In reply to the President, one could not argue from a single case, but had he had a suspicion it was cerebro-spinal rhinorrhœa he would not have operated.

Endothelioma of the Ethmoid.—**Dan McKenzie.**—The patient, a woman, aged twenty-three, came under my care in May of this year. For about a couple of months she had been noticing some stuffiness in the right nostril, and a fortnight before her first visit to the hospital she became aware of the presence of a small swelling on the right side of the bridge of the nose. This swelling, which at first sight looked more like a hæmatoma from a trauma than anything else, turned out to be an extension through the right nasal bone of a growth in the ethmoidal region. Further examination revealed a second extension of the growth into the orbit, where it could be felt deep to the inner canthus. The eyeball was markedly displaced outwards, but there was no diplopia. Intranasally, there was very little to be seen. The middle turbinal seemed to be fuller and lower than normal, but no sign of new growth could be discerned. Probing the ethmoidal region, however, set up very free

bleeding. The diagnosis of ethmoidal tumour, probably malignant, led to operation on May 15. The nose was opened through a lateral incision traversing the protuberance on the nasal bone, and the whole mass, light, loose and very vascular, was scooped out with sharp spoons. It seemed to be growing from the cribriform plate, and it involved the whole ethmoidal labyrinth on the right side, including the middle turbinal. A flattish mass about the size of a terminal digit lay in the orbit, the mesial bony wall of which had been destroyed. In addition to that, and to the window in the nasal bone through which the tumour had reached the subcutaneous tissue of the nasal bridge, there was also a fenestra in the ethmoidal septum. Save for rather free bleeding, the operation presented no difficulties, and healing by first intention resulted, except at the spot corresponding to the lump on the nose, where the wound remained opened for some weeks. It is now entirely closed, but an adherent depression marks this spot. There is, so far, no sign of any recurrence. Unfortunately, the specimen was not suitably preserved, and when Dr. Wingrave came to examine it he hesitated to commit himself as to the nature of the growth. It "looked like endothelioma."

The PRESIDENT said that there was an advantage, when dealing with extensive intranasal malignant growths, in a combination of the Denker and the Moore operations. He did that ten days ago in a case of sarcoma where the disease was very extensive, involving the antrum right up to the frontal sinus. The combined operation enabled him to clear out the whole interior of the nose.

Epithelioma of Floor of the Mouth and Tongue, and Ulceration on the Palate.—W. M. Mollison.—J. C——, aged seventy-two, was shown at a meeting of the Section in June last.¹ At that time he had a movable whitish mass under the tongue and ulceration on the palate. The surgeon under whom the patient was admitted considered that operation was inadvisable; the man had therefore been having treatment with X-rays. The ulceration on the palate had changed very little either in extent or in appearance and its pathology was still *sub judice*. The mass under the tongue had developed into a typical ulcerating epithelioma deeply invading the tongue.

Mr. HERBERT TILLEY considered the ulceration on the palate to be epithelioma. It was uncommon to find a growth on the floor of the mouth and unconnected with another growth of the same nature on the soft palate. At the present time he had under his care an old man who had syphilitic scars and granulation areas in the soft palate. From time to time during the past two years these granulations had disappeared under local and general anti-syphilitic treatment, but recently one small area had refused to heal; it had increased in size and now presented an everted edge which histological examination showed to be epithelioma. In Mr. Mollison's patient it would be easy to remove a piece under local anaesthesia and submit it to the microscope.

Mr. DE SANTI asked whether Mr. Mollison had any idea of operating on the epithelioma. He regarded the case as hopeless, and would recommend diathermy; very good results had been shown after diathermy by Mr. Harmer in such cases.

Mr. HARMER regarded both growths as epitheliomata, and did not think such cases were excessively rare. During the last two years he had seen two cases with two epitheliomata in the upper air-passages, about

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, 1914, p. 39.

2 in. apart. One man had epithelioma of the lower lip and a separate growth involving the tonsil and part of the tongue. The other was a man from whom he removed an epithelioma of the soft palate, and shortly afterwards he discovered that there was an advanced growth between epiglottis and tongue. As there had been no symptoms, the laryngeal growth had been overlooked. In the present case he believed the greater part of the disease could be destroyed by diathermy. He would treat the front of the mouth first and afterwards the palate, if that were found to be malignant.

Mr. A. J. WRIGHT agreed with Mr. Tilley that the growth on the palate was epithelioma. Two years ago he saw a man who had had his tongue removed for epithelioma, and six months after operation was found to have epithelioma of the oesophagus, which led to the death of the patient: the nature was verified *post mortem*.

Mr. CLAYTON FOX said that in view of the multiple nature of the growth it would be well to know whether the Wassermann reaction had been tried, and whether the patient had had leucoplakia, and been an ardent smoker or imbibor of spirits.

Mr. MOLLISON replied that he was not aware that the patient had had any leucoplakia; the Wassermann reaction was negative, though the result was not very satisfactory as the patient was already taking iodide. No operative treatment was suggested as the growth was too extensive. He would try diathermy, though his previous experience of the method had not been very good: possibly he had been using the wrong applicator. If possible, he would remove a small piece from the palate for microscopical examination.

Pneumococcal Infection of the Pharynx and Larynx.—Philip Turner and W. M. Mollison.—H. F.—, aged twenty-three, was admitted to hospital in April last on account of tenseness and a brawny swelling in the right submaxillary region; this was incised under an anæsthetic. During the course of the operation the patient developed so much dyspnoea as to necessitate a laryngotomy; the tube was removed in a day or two and the patient made a fair recovery, though he had all the time some swelling about the pharynx and tonsils. In July the patient was readmitted with increasing dyspnoea. Tracheotomy had to be performed and ever since the tube has been worn. Examination of the larynx before readmission had shown œdema of the epiglottis and ary-tænoid regions.

In August a further examination of the patient was made under an anæsthetic; it was found that the soft palate and uvula were œdematous and the tonsils large and ragged. The right tonsil contained a cavity into which the tip of the finger could be introduced; it was enucleated, and on bacteriological examination a pure culture of pneumococcus was obtained. The œdematous epiglottis was punctured and cultivations taken from the serum obtained; these cultivations showed pneumococcus and *Micrococcus catarrhalis*. The patient still has much swelling about the upper aperture of the larynx, and is unable to dispense with the tracheotomy tube. The temperature has varied from 99° to 97° F., except for two days following the tracheotomy. Two weeks ago the patient had a quinsy on the left side.

Dr. DAN MCKENZIE said that two years ago he showed a case¹ which this reminded him of—a woman, a cook, well over middle age. The

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvii, p. 156.

disease first simulated sarcoma of the pharynx; there was great œdema of pharynx and larynx, and neck, the hollow of the neck being filled up. The œdema slowly spread to the larynx below the glottis. He tracheotomised early, and she wore her tube eighteen months. Finally, after many vicissitudes the tube could be dispensed with, and she was able to return to her work. There still remained some subglottic stenosis in the cricoid region, of a cicatricial character, and her breathing was somewhat impeded; otherwise her condition was as good now as it was before her illness. He suggested that a similar course of events might occur in this case, and the patient recover; that is to say, we were dealing in these cases with a slow pneumococcus infection of the cellular tissue, slowly advancing, slowly retreating, and finally slowly disappearing with little scarring or contraction.

The PRESIDENT asked whether serum had been tried. He had himself tried it in one case, but without any very good result.

Mr. MOLLISON replied that a pneumococcal vaccine had not been tried. Since this case he had seen two of pneumococcal infection of epiglottis or larynx at Guy's Hospital. The first was a woman of the type mentioned by Dr. McKenzie; her epiglottis was so much enlarged that she had some dyspnoea and dysphagia. He punctured the epiglottis, cultivated the serum, and found a pure growth of pneumococcus. She got well in four or five weeks. The other case he saw a week ago, and here also there was much swelling of epiglottis and arytenoids. On puncturing the epiglottis, he obtained a growth of pneumococcus. That patient was also slowly recovering.

Mr. PHILIP TURNER, in reply, said that although no vaccine had as yet been used for this patient he was slowly recovering; he could now get some air through the larynx.

Tumour of the Soft Palate.—Thomas Guthrie (*see p. 68*).

The PRESIDENT said he thought these glands were very much like glands met with in the soft palate of the rat, which were regarded by the biologist as of the type of mucous gland.

Dr. H. J. DAVIS said he had not seen the case, but asked whether it was possible that a piece of adenoid tissue had got implanted on to the palate; he had seen such fixed on to the back of the pharynx after incomplete removal.

Mr. GUTHRIE replied that he did not think it was adenoid tissue, as it showed lobules and resembled salivary gland. He had not found any record of a similar case. There were cases recorded of so-called mixed parotid tumour in connection with the palate, but he regarded them as endotheliomata.

Fixed Crico-arytenoid Joint; Phthisis; Healed Tertiary Syphilis.—T. B. Layton.—A woman, aged thirty-four, was being treated with X rays for a skin lesion on the lip. Complaining of a sore throat she was sent to the Throat Department, where it was found that she had a tertiary syphilitic ulceration of the pharyngeal wall. The Wassermann reaction was positive. She was given salvarsan and a course of mercury, and the pharyngeal condition cleared up. She has also a fixed left crico-arytenoid joint which she says she has had since she was fifteen, and which followed an acute specific fever. Signs of phthisis are present at both apices, and tubercle bacilli and elastic fibres are present in the sputum.

Mass attached to Laryngeal Wall.—**T. B. Layton.**—A woman, aged forty-one, has had a short, dry cough since birth. In 1911 she consulted a doctor for cough and hoarseness. In August, 1912, she went to another, who had the sputum examined and tubercle bacilli were found in it. In November, 1912, she complained of cough, hoarseness, and languor, and had a temperature of 100.4° F., with physical signs of limited active disease at the right apex. Examination of the larynx showed that the cords did not meet on phonation, the left arytaenoid was reddened, and a small nodule was seen on the epiglottis near the top. During the night of November 12, 1912, she had a hæmoptysis of a few ounces. She was sent to a sanatorium and returned to London in October, 1913. Ten days before the meeting the whole larynx was acutely red; peeping out from under the front end of the left false vocal cord was an intensely red polypoid mass. On the anterior surface of the left arytaenoid process there appeared to be some ulceration. One week later the larynx was much better. The polypoid mass still projected, but was now of a pink rather than a red colour, the general laryngitis was well, the condition of the arytaenoid process nearly so. There are now no signs of active tuberculosis in the lung.

The PRESIDENT suggested that the mass might be a prolapsed sacculus laryngis.

Tumour of Right Vocal Cord.—**T. B. Layton.**—A man, aged twenty-four, has complained of a "rising in the throat" whenever he swallows his saliva. He has a subacute pharyngitis with very carious teeth. On examining the larynx a small mass lies attached to the right vocal cord and half covered by it. It is the colour of the rest of the cord, and lies just behind the middle of the glottis, being the size of an ordinary pin's head. Attention to the teeth and a gargle cured the pharyngeal symptoms. No symptoms attributable to the laryngeal mass were present.

Dr. JOHNSON HORNE regarded it as pachydermia, for which he counselled rest of voice.

Dr. FITZGERALD POWELL thought it was a small fibroma, which should be removed by the guarded cautery.

Mr. DE SANTI advised leaving it alone.

A New Pattern of Knife and Cartilage Scissors for Submucous Resection of the Septum.—**F. H. Westmacott.**—The knife exhibited presents a long and curved blade, with a cross-handle, which gives a firm grip to the instrument. The curve enables the operator to cut the cartilage above and below, in two sweeps; the curved incisions meet posteriorly by intersection. The special feature, however, is the cutting edge of the knife, which is a V-shaped curve and will cut through the softest cartilage, because it always presents a sliding edge, and obviates the difficulty experienced with any transverse blade of a soft cartilage doubling up before it and not being cut through.

The scissors also shown are curved in the same radius as the knife, and the whole incision of the cartilage may be carried out with them. The edges are serrated, to prevent slipping of the cartilage between the blades.

The PRESIDENT said that the longer he continued doing the operation of submucous resection, the fewer instruments he relied on. He had now practically abandoned Killian's and Ballinger's knives, and adhered

to the ordinary forceps, with which he got out ordinary cartilage and bone satisfactorily. The membrane was very rarely perforated.

Dr. FITZGERALD POWELL thought that the scissors shown would be found most useful. There was often much trouble in starting the incision in the cartilage with the swivel knife.

Dr. KELSON asked whether the instrument was used only for the cartilaginous portion of the septum.

Mr. WESTMACOTT replied that he did not attempt to remove the bony portion of the septum with a knife, but used punch forceps for that. With a knife one was liable to fracture the vertical ethmoidal or cribriform plate.

Tonsils enucleated by Matthieu's Guillotine.—F. H. Westmacott.—The specimens were taken from seven successive cases operated upon to demonstrate that tonsils may be enucleated by means of "Matthieu's" guillotine, after the upper pole of the tonsil has been dug out and tilted forward by means of the forefinger only.

The Rhinomanometer.—H. A. Kisch.—The instrument has been designed for the purpose of ascertaining whether slight degrees of nasal obstruction are present. It will indicate both inspiratory and expiratory obstruction. The principle of the instrument consists in measuring of the distance through which a column of water can be moved in a definite time. During the test the mouth is kept wide open. The instrument is a glass tube with a wide nose-piece, and a resistance at the distal end.

The PRESIDENT said the difficulty about these instruments was to apply them in an absolutely natural method, without disturbing the nasal passage. He supposed it was necessary to put the bulb of the instrument into the nostril so as to get the air to go through, the other nostril being closed at the same time. Once the nostrils were touched or influenced, the air-stream was modified.

Mr. WESTMACOTT said the rhinomanometer was useful for demonstrating to patients that nasal obstruction existed. Last week he had a case in which there was complete obstruction of both nostrils, yet the patient declared there was no trouble about breathing through the nose, and there was no snoring. He proved to the patient that it was a physical impossibility to breathe through the nose. It was also useful when obstruction was complained of, and yet there was a free passage. He recently had such a case in a girl claiming under the Workmen's Compensation Act. She had an accident in the mill, which smashed in the nasal bones and crumpled up the septum. She said she could not go back to work because the air was dusty and she had obstruction of the nose. A colleague had removed the turbinal bodies and straightened the septum, and there was even more than the normal amount of airway.

Mr. Kisch, in reply, said that it was difficult to determine whether there was slight obstruction. The instrument was designed for this purpose. He had tried to obviate the objection mentioned by the President by making the nose-piece large. This rested in the orifice and the opposite nostril was closed by the thumb pressed upwards in the same way.

Fibroma on the Vocal Cord.—H. J. Davis.—Patient a woman, aged thirty-six. The tumour, the size of a pin's head, is either a fibroma

or papilloma and is attached to the anterior surface of the cord, but is very difficult to see owing to its position in the anterior commissure. It evidently drops down between the cords on phonation, causing cough and slight hoarseness. November 25: The growth was removed by the direct method with Paterson's forceps and proved to be a soft fibroma.

Farthing in the Œsophagus of a Baby, aged two.—H. J. Davis.—The coin, which was vertically impacted, was removed with the President's forceps by the direct method. A skiagram showing the coin was exhibited.

Fixation of the Right Vocal Cord, producing no symptoms.—H. J. Davis.—The patient is an actor, aged sixty-one. He came for deafness. In the course of examination it was observed that the right cord was drawn to the middle line, and, on phonation, the glottis presented the appearance, shape and direction observed in left complete total recurrent paralysis, although it is the right cord which fails to abduct; this points to the diagnosis of ankylosis of the right arytenoid joint. The patient states that, in 1873, he was operated on in Paris by Isambard, who removed a "fibro-mucous polypus" from the right cord. He was then taken to the hospital and exhibited to the students as a curiosity, as this was one of the first intra-laryngeal operations successfully performed in Paris. The patient had no symptoms and the voice is strong and powerful, but the cord is motionless on abduction.

Mr. CLAYTON FOX said he thought that the cords moved both in adduction and abduction; there was hampering of movements of the right cord, but that could perhaps be accounted for by over-use of the voice, inducing functional paresis.

Mr. HERBERT TILLEY agreed that the right cord moved, but the movement was not free.

Dr. DONELAN said it looked rather like abductor paralysis of the right vocal cord in a previously oblique larynx. He would like to know why Dr. Davis abandoned the diagnosis of ankylosis. He had shown several years ago a young lady who, during an Alpine excursion, had got sudden laryngitis affecting the right arytenoid body, and having appearances very like those in this case.

Dr. H. J. DAVIS, in reply, said he did not consider that the right vocal cord on abduction moved at all. The man had right abductor paralysis, and the left cord did not adduct normally, hence the glottis was askew. The patient had had no symptoms since the operation, which was in 1873, and he did not know there was anything the matter with the larynx.

Peculiar Deformity of the Lower Jaw.—H. J. Davis.—A girl, aged eighteen. The patient had had four operations for adenoids. There appeared to be no chin, and the report from the X-ray department was that the ascending ramus of the mandible was absent on one side. It was suggested that the deformity might be the result of long-standing nasal obstruction.

Mr. DE SANTI said the ramus was present, and could be felt by putting one finger inside the mouth and another outside. Moreover, he could feel the condyles moving in the mandibular joint. He looked upon the condition as a rudimentary jaw.

Small Tuberculous Ulcer of the Aryepiglottic Fold, close to the Attachment of the Margin of the Epiglottis.—J. Dundas Grant.—The patient is a middle-aged woman, suffering from pulmonary tuberculosis. She complained of violent pain on swallowing, which she located in the lower part of the left side of her throat; when asked she stated that it frequently shot up to the left ear. The extreme pain had been present for a week, but for two months she had complained of a feeling as of something sticking in the throat. The throat was very irritable, and on the first cursory examination no ulcer was visible, but on further closer examination an ulcer, localised at the anterior part of the left ary-epiglottic fold, was to be seen.

The exhibitor has occasionally seen cases of such extreme pain with apparently no visible lesion of the framework of the larynx. He considers it possible that a similar condition to that existing in the present case—though in a slighter degree, and eluding inspection—may have been the cause of the pain.

Perforation of the Septum Nasi causing Inspiratory Whistle.—Douglas Harmer.—Patient had severe epistaxis after boxing seven months ago. Otherwise he had never been troubled by his nose, and no operation has been performed. There was a small perforation in the anterior part of the septum, and the whistling noise was produced by inspiration. The whistle could be stopped by plugging the hole. The perforation could probably be cured by a flap operation.

The PRESIDENT said he remembered a similar kind of case, in which the whistling was most noticeable when the person happened to be annoyed. That patient declined a flap operation, therefore he had the hole enlarged, which stopped the whistling.

Epithelioma of Epiglottis, with Extensive Involvement of the Cervical Glands on both sides; Removal of Epiglottis and Glands.

—P. R. W. de Santi.—Male, aged sixty-three. Seen in the third week of March, 1913. History of slight sore throat and difficulty in swallowing three months. On examination a well-marked, irregular, hard nodular growth was seen, occupying the whole of the left side of the epiglottis, and extending over to the right side and towards left ary-epiglottic fold. Examination with the finger revealed considerable hardness and fixity of the epiglottis. The cervical glands of the neck were extensively involved on both sides. A piece of the growth was removed for microscopic examination, and revealed typical epithelioma. Wassermann negative. I performed tracheotomy and laryngo-fissure, and removed the epiglottis freely and wide of the disease. Some three weeks later the glands were removed on both sides of the neck, and on the right side I had to remove $2\frac{1}{2}$ inches of the jugular vein. The patient left the hospital two weeks later. The glands microscopically showed typical epithelioma. The case is shown to illustrate the good results that may follow a very free removal of the epiglottis for carcinoma without having recourse to complete laryngectomy, a procedure usually done for malignant disease of the epiglottis, also to illustrate the very extensive implication of the glands in so early a stage. He is at present free from disease, but it is only seven and a half months since operation.

The PRESIDENT said Mr. de Santi was to be congratulated on a most admirable result. He asked whether there was any infection of the interior of the larynx.

MR. DE SANTI replied that it was an early case, and the disease was

limited to the epiglottis. Five glands examined afterwards showed typical epithelioma. In former days Mr. de Santi would probably have removed the whole larynx for such a condition, but greater experience led him to adopt, when possible, a less severe operation.

Large Pulsating Vessel in the Right Posterior Pharyngeal Wall.—**J. H. Connolly.**—The patient, a boy, aged five, has enlarged tonsils and adenoids, associated with nasal obstruction, and would probably be benefited by their removal. This large blood-vessel is a danger—an uncommon one—and may contra-indicate operative interference. Presumably it is the internal carotid or the ascending pharyngeal artery, or perhaps it may be an abnormal vessel. Its size appears large for the ascending pharyngeal, although it is true that the pulsation is apt to give a wrong impression of the calibre of the vessel. He was inclined to regard it as the internal carotid, and, whilst prepared to remove the tonsils, thought it wise to leave the adenoids alone.

The PRESIDENT said the vessel looked like the ascending pharyngeal, and he did not think there would be much difficulty in removing the adenoids without damaging the vessel.

Dr. H. J. DAVIS agreed that the vessel was the ascending pharyngeal. It appeared to be more at the side than it really was, as the tonsils were so large, but if they were not there the vessel would be seen to be much nearer the mid-line than it seemed. He would leave the adenoids alone.

Mr. HARMER recollected a case in which the house-surgeon removed one tonsil, and there was a tremendous rush of blood, obviously from some large artery which had been cut. The bleeding lasted only a few moments, but a few hours later was repeated, and the patient died. *Post-mortem*, the girl was found to have two complete coils in the internal carotid arteries, and these coils pushed in towards the middle line, under the posterior wall of the pharynx; in cutting off the tonsil one of the coils had been completely removed.

Dr. DONELAN said that Dr. Jacobson, of New Orleans, reported a case in private practice some twenty years ago, in which he had to tie the common carotid before hæmorrhage could be arrested. It was tonsillectomy. That patient recovered, so it was impossible to ascertain the nature of the abnormality.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Meeting at the Royal Infirmary, Edinburgh, November 22, 1913.

MR. J. D. LITHGOW *in the Chair.*

Reported by DR. W. S. SYME.

The Radical Mastoid's "First Dressing."—**J. D. Lithgow.**—
(See JOURN. OF LARYNGOL., RHINOL., AND OTOL., November, 1913,
p. 589.)

The Mechanism of one form of Respiratory Stoppage under General Anæsthesia (Ethyl Chloride).—J. D. Lithgow. (See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 646.)

Dr. TURNER some years ago had made a number of experiments on the cadavers of children in connection with the production of laryngeal stridor, and what struck him in regard to Dr. Lithgow's explanation was that it was not quite an anatomical possibility. What he wanted to know was whether Dr. Lithgow was sure that the epiglottis was drawn against the posterior pharyngeal wall.

Dr. LITHGOW replied that he had no doubt at all about the correctness of the view he had put forward. He had not only felt the epiglottis fixed to the posterior pharyngeal wall; he had seen it. He had observed this condition on four occasions, and all the patients were beyond the age of early childhood, the epiglottis being larger than that of a small child.

Carbolic Acid in Glycerine for Turbinal Hypertrophy. (Preliminary Contribution).—J. D. Lithgow and Peel Ritchie.—Carbolic acid in glycerine solution has been used for many years as an injection into hæmorrhoids to induce fibrosis and cause shrinking. It has also been used in the same way in the treatment of small simple tumours. The nasal cases in which this method has been tried have been of vasomotor and hypertrophic rhinitis, and they have been so far satisfactory, *quâ* the induction of fibrosis. The shrinking following the injection is quite as marked, if not more so, than when galvanic cautery is used, and it appears to have the additional advantage of a sterile trauma. The operation is quite painless. The method followed is to inject two or three drops of a 60 per cent. solution of carbolic acid in glycerine into the previously anæsthetised inferior turbinate as close to the bone as possible. It is followed by a period of reaction and engorgement which quickly passes off, and a slow process of shrinking lasting a month or so. In some of the cases the turbinate tissue was at the end of a month or two sufficiently shrunk to admit free nasal respiration; in others, owing to some septal deviation, one removed a portion of inferior turbinate. We have thus been able to study the process of fibrosis microscopically at various stages, and hope to make further communication in reference to the histopathology of the process.

Mr. PEEL RITCHIE said this method had been in use for many years for piles, and his experience of it was very satisfactory; he had also tried it in other conditions. The advantage was that without producing any ulcerated surface one got the same results by fibrosis as by removing the growth. The process took some time—a number of weeks. That was one point on which they hoped to get information by further examinations. There was an immediate reaction involving swelling and œdema of the parts; this, however, passed off fairly rapidly. It required a certain amount of experience to know just how much of the carbolic solution to inject.

Dr. KERR LOVE asked if in removing a portion of the large turbinate there was less bleeding than usual.

Dr. LITHGOW replied to Dr. Love's query in the affirmative.

Malignant Disease of the Buccal Pharynx and Laryngo-pharynx, both after Operation. Parts Involved in First Case—Tonsil, Alveolus, Tongue, Lateral Pharyngeal Wall; in second one—the Right

**False Cord, Aryepiglottic Fold and Adjacent Laryngo-pharynx.—
J. D. Lithgow and Peel Ritchie.**

Mr. PEEL RITCHIE said there was extensive involvement of the glands on one side and a preliminary operation was done for this. The cheek was split up short of the masseter; the growth was outlined by the fine point of the cautery; the mucous membrane was snipped through with scissors. The broad blade of the thermo-cautery was used for division of the muscles, and the raw surface was covered in completely with membrane. The right side of the split uvula was turned over to cover in the raw area. The very tip of the uvula projected down on the left side into the mouth where the adhesion was not quite complete. He did not think there was any advantage, for the purpose of obtaining a better view, in operating from the opposite side. Moreover, it was an advantage to have the primary wound and the wound for the gland operation on the same side in the after-treatment.

**Chronic Subglottic Infiltration, Probably Specific in Origin.—
W. T. Gardiner.**—The patient, a married woman, seen for the first time five months ago. She then complained of "thickness of voice and some difficulty in breathing for the past six weeks." She thought it came on after an attack of "rheumatics." She also had a cough and some expectoration. Husband died of general paralysis ten months ago. She has six children; no history of miscarriages. The patient had a hard, almost brassy cough, and there was some inspiratory difficulty after coughing. The epiglottis and arytenoids were normal. There was slight fulness of the interarytænoid region, especially on the left side, where it seemed to become continuous with a pale, smooth, rounded infiltration situated below the left cord. This infiltration was most marked beneath the posterior part of the cord. The movements of the cord during respiration were very slight, and both adduction and abduction were limited. The pallor was very marked. The patient was given potassium iodide. She reported herself slightly improved one month later, but on examination, although the original infiltration was smaller, and the movement of the left cord a little improved, there was now a swelling similar to the first one on the right side below the right cord. The right cord moved perfectly. The iodide was now increased, and the condition is slowly improving. Examination of the sputum for tubercle bacilli was negative. A month ago the patient brought her son, aged ten, to the dispensary to have his tonsils removed, when it was discovered that he had active interstitial keratitis in the right eye.

Dr. FRASER asked what the condition of the chest was and whether Wassermann had been performed.

Dr. BROWN KELLY thought the want of movement very suggestive of malignant disease, and asked if it had not struck any of the members in that light. The temporary improvement, of course, did not necessarily exclude malignant disease.

Dr. SYME thought, like Dr. Kelly, on first looking at the patient that the condition was malignant. The woman's age (thirty-five) did not put that out of court; also the fact that the thickening was confined to one side was in favour of a malignant condition. Had it been specific, one would have expected some evidence of breaking down. Altogether it appeared to him more like a malignant than a specific condition. He suggested that a portion should be removed for examination, and this could be done without doing any harm if it did turn out to be specific.

Dr. KERR LOVE thought Dr. Gardiner should take the case into hospital and give large doses of iodide. He thought it was specific.

Dr. FULLERTON thought it might be tuberculous. In a case which he had had the patient went away for a change for two or three months, and came back very much better. The condition in that case was practically the same as in this one.

Dr. WHITEHOUSE remarked that both cords were implicated; he thought it was bilateral and specific.

Dr. LOGAN TURNER had seen the case with Dr. Gardiner before treatment was commenced, and it was then bilateral. That was rather against malignant disease.

Dr. WALKER DOWNIE thought the want of movement was partly due to fixing of the arytenoid.

Dr. GARDINER replied that the chest had been examined on three occasions, with negative results. No Wassermann was done. He was considering having it done when the mother brought her child who presented evidence of specific disease, which seemed to render a Wassermann unnecessary. He would have one done, however, and he would report the further progress of the case at the next meeting.

Bleeding Polypus of Nasal Septum; Microscopic Specimen shown.—W. T. Gardiner.—The patient, a female, aged eighteen, came in the beginning of August suffering from nasal bleeding. History of epistaxis, more or less constant for four weeks, becoming much worse in the last week, so that patient had lost a great deal of blood, and was having attacks of giddiness. The right anterior naris was filled up with blood-clot. On removal of this a smooth rounded mass, dark red in colour, was seen occupying the front part of the inferior meatus. It was movable on a narrow pedicle, and bled readily when touched with the probe. It was attached to the anterior part of the septal cartilage near the floor of the nose. It was removed by the snare, and the base cauterised with chromic acid. The polypus was about the size of a small bean. One month later the patient returned, complaining once more of epistaxis. On examination there was a red mass in the original position, and apparently as large as before and bleeding as readily. It was again snared, and this time the base was cauterised with the electric cautery. Reported (November 3) no further hæmorrhage. Site of the polypus indicated by a firm scar. *Histology.*—The section comprises a portion of the tissue the size of a pea. The surface is fairly regular, but with one or two minute slightly polypoid projections. The surface is covered with a layer of stratified squamous epithelium. The greater part of the section is made up of collections of young cells of connective-tissue type, arranged for the most part in relation to vascular spaces, which vary greatly in size. In some parts the amount of fibrous-tissue is greater and closely surrounds the blood-spaces. The condition is evidently angiomatous and blood-corpuscles are visible in many of the spaces. The extremely cellular character of the greater part of the tissue makes it difficult to exclude a sarcomatous element in the case. It was reported by Dr. Theodore Shennan as probably not angio-sarcoma.

Dr. FRASER had had the opportunity of dealing with three or four similar cases. His practice had been to inject the base with novocaine and adrenalin, make a lozenge-shaped incision round the growth and dissect it off the cartilage. In this way one removed it entire and also obtained a better specimen for microscopic examination.

Dr. BROWN-KELLY thought the interesting point of the case was the

difficulty of excluding sarcoma. He had had a case of much the same kind. The patient, a young man, came with a diffuse growth on one side of the septum; he had been sent as a case of sarcoma. As there was some doubt a piece of the growth was removed for examination. While the matter was still *sub judice* the patient suddenly disappeared. Two years later he came back complaining of something else, and stated that he had not returned after his previous visit because he had been in prison. On examining the site of the growth it was found normal, and the septum, which has been pushed to the opposite side, and the upper lateral cartilage, which had been elevated, had regained their normal position. On inquiring as to the result of the microscopical examination, the pathologist reported that it was suggestive of sarcoma.

Dr. LITHGOW said in his last case there was a very narrow pedicle; he snared the growth off. He saw the patient some time afterwards and no evidence of the growth remained, and when seen a year later there had been no recurrence. It was a typical papilloma, the size of a hazelnut. The smallness of the pedicle was unusual in papillomata.

Dr. GARDINER, in reply, said that at a future period should another case occur he would endeavour to remove the growth by the method recommended by Dr. Fraser, the advantage of which was that the base of the polypus could be got away practically completely. By snaring one did not see the entrance point of the vessel.

Temporo-sphenoidal Abscess; Recovery.—W. G. PORTER.—Male, aged twenty-one, was first seen on August 7, 1913, complaining of otorrhœa since infancy. The discharge had increased during the previous week, and he had also suffered from severe headaches during that period. On examination a large polypus, bathed in very foetid pus, was seen nearly filling the right meatus. Functional examination showed complete deafness on that side, and the labyrinth did not respond to stimuli. Left ear healthy. Temperature and pulse normal. A radical mastoid operation was performed on the following day. The antrum was filled with granulations, and the dura of the middle fossa was found to be exposed and covered by granulations. The ossicles were not seen, and the oval window was empty. On smoothing the anterior surface of the spur with the chisel the face twitched once, and on waking from the anæsthetic the patient was found to have a facial paralysis, which became complete, but which is now fortunately passing off. A few days after the operation the patient began to complain of headaches; he slept badly, and was slightly delirious at night; the radical cavity appeared clean; there was very little discharge; the temperature was normal; the pulse did not fall below 60; and the examination of the nervous system was negative. Ten days after the operation a profuse discharge came from the ear during the night, soaking the pillow; the headaches were at once relieved, and the patient felt very well. It was supposed that a subdural abscess had evacuated itself, but as the patient appeared very well there seemed to be no indication for interference. The patient continued to feel well, and the discharge to be slight, till August 24, when the headache returned, and there was more discharge; pulse, 50; temperature, 98.2° F. On the 25th the wound was reopened, and pus was seen lying on granulations springing from the dura. On probing this area the probe slipped directly upwards into the brain. The bone was freely removed, exposing an area of dura larger than a penny piece; the granulations were removed, the dura incised, sinus forceps passed into the brain, opened and withdrawn, and at once about 2 oz. of very foetid pus

evacuated. (The pus showed a streptococcus in pure culture.) A large drainage-tube was inserted into what was felt to be quite a large cavity, the posterior wound was left open, and the patient returned to bed. Considerable difficulty was experienced in maintaining drainage. The pulse, which fell to 40 after the operation, continued to be slow (40 to 48) for a fortnight, and the temperature subnormal (97.8° to 98.2°). The pulse rose to 50 on September 8, and the discharge thereafter gradually diminished; the tube was finally removed on September 29. Since that date the patient has done well, the posterior wound has closed, and he has gained in weight, and is now thinking of returning to work.

Dr. KERR LOVE asked what method was used to enter the middle fossa; did he go straight in through the squamous bone or did he extend the wound upwards from the mastoid opening?

Dr. PORTER said the dura was exposed by the disease, and the opening enlarged at the operation.

Apparent Post-operative Osteomyelitis of the Frontal Bone; Recovery after Wide Removal of Diseased Bone.—W. G. Porter.—The patient, a female, was referred from the Eye Department. She complained of double vision and a swelling just above the right eyeball towards the external canthus, and there was also definite proptosis.

After examination a diagnosis was arrived at of empyema of the right frontal sinus and ethmoidal labyrinth with orbital abscess. Killian's operation was performed on May 14, 1912. The frontal sinus was found to be filled with creamy mucopus (pure culture of streptococcus obtained), but the lining membrane was not thickened; hence it was thought that the case was one of an infected mucocele. The floor of the sinus had given way rather far back, and pus was lying on the orbital periosteum, which at this spot was covered with granulations; there was a very well-marked orbital extension, fully $1\frac{1}{2}$ in. in depth. In smoothing off the bone close to the intersinus septum the latter was unfortunately cracked, exposing the sinus on the opposite side. The wound was entirely closed, and healed by first intention. Three weeks later the upper eyelid became oedematous; the wound was reopened and a quantity of pus evacuated. The discharge continued in spite of the administration of an autogenous vaccine and endeavours to obliterate the sinus by pressure.

A second operation was performed on October 3, 1912. The inner end of the bridge was removed, and a sinus was traced to the hole in the septum, where pus was seen coming from the left frontal sinus. The outer part of the right frontal sinus was obliterated by dense fibrous tissue, as was the opening into the nose. A Killian operation was performed on the left side; this sinus also had a deep orbital extension. The inner part of the incision was left open after the operation, sutures being passed but not tied till forty-eight hours had elapsed, there being then no discharge. The wound healed at once, but a few days after the upper eyelid became swollen, and pain was felt at night; there was no pyrexia.

On November 11, 1912, the swelling was more marked, and there was marked tenderness on pressure over the bridge. The wound was reopened, the inner end of the bridge was divided, and it was then found to be loose, a sequestrum, consisting of the bridge and part of the malar bone, being removed; no pus was evacuated. The wound was left freely open and packed. The pain was not relieved by the operation

and the upper eyelid remained swollen. The temperature varied between 98.4° and 99.2° F.

On the 17th œdema of the skin was noted over the frontal sinus; this spread rapidly, and on the 20th extended up to the hair margin and across the middle line; there was, however, very little discharge from the wound, which was still kept widely open. It was believed that osteomyelitis had set in, and wide removal of the frontal bone appeared to offer the only hope of recovery. Accordingly, the following day a mesial incision was made upwards from the root of the nose, and a triangular flap of skin and periosteum turned back. The bone appeared glazed on the surface; a large circle of bone was removed with hammer and gouge; the bone was about half an inch thick, very soft and vascular, and did not give the usual ring when struck. The margins of bone were further removed with bone forceps until a firmer consistence and diminished vascularity appeared to show that the limits of disease had been reached. There was no pus in the substance of the bone, and the dura appeared healthy. The skin was then replaced and fixed in position by a few interrupted sutures. There was considerable discharge from the wound for some days, but healing gradually took place, undoubtedly assisted by the administration of an autogenous vaccine.

The patient had no further trouble in the operation area, and she remained in excellent health until three weeks ago, when she had an attack of pneumonia which carried her off in a few days.

Dr. FRASER thought the microscopical sections shown by Dr. Porter showed a mild condition of osteomyelitis. The bone itself was almost normal, but there was evidence of a subacute inflammatory process in the marrow spaces, and new bone staining faintly with eosin was deposited round the margins. The same condition was seen in the chronic form of mastoiditis. Personally he had no doubt that it was a case of osteomyelitis.

Dr. LOGAN TURNER had had the opportunity of seeing the case before the operation. Speaking from the clinical point of view, he would have said there was no doubt at all about the case being one of osteomyelitis secondary to frontal sinus disease, having himself had previously a fatal case of this kind.

Dr. PORTER, in reply, said he was indebted to Dr. John Fraser for the sections of bone, who was inclined to think the process was not an acute osteomyelitis. If it was a case of osteomyelitis, it was the first post-operative case which had recovered.

Foreign Body (Halfpenny) in Œsophagus of Child for Eight Years.—W. G. PORTER.—Male, aged eleven, complained of indefinite gastric symptoms of three weeks' duration, but on the history being elicited the father stated that the boy had swallowed a halfpenny at the age of four, and had never been the same boy since. The boy weighed 2 st. 10 oz. on admission, and was small for his age and poorly developed.

An X-ray photograph was taken and showed a foreign body in the œsophagus between the fifth and sixth dorsal vertebræ. He was referred to me for œsophagoscopy, which was done under general anæsthesia; the halfpenny was seen lying low down in the œsophagus nearly edge on. On introducing the forceps to seize the coin it slipped away out of sight into the stomach. On carefully inspecting the œsophagus where the coin had been lying, no ulceration or lesion of any kind could be detected. The patient remained in hospital for a fortnight after this procedure; he improved markedly in health and increased 5 lb. in weight. A skiagram

was taken again before his discharge, and the halfpenny was not seen in any part of the œsophagus or abdomen. The boy stated one day that he had passed it, but it was not found in the stools.

Dr. TURNER thought this case of great interest as showing how long a foreign body could remain in the gullet without giving rise to symptoms. He did not know whether any case of such long duration had been recorded. Sir StClair Thomson had recorded a case in which the foreign body had remained in the œsophagus for three or four years. He himself had seen a case in which a halfpenny had remained in the œsophagus for only one week and the patient died; in that case death, he believed, resulted from the old-established methods used for the removal of the coin, and not from the presence of the coin.

Dr. WALKER DOWNIE asked if any permanent injury to the gullet had followed. He had had among many such cases one of a child who had a halfpenny lodged in the gullet for eighteen months. The child was in Ireland at the time the accident happened, and he was treated there at first, but as nothing passed by the rectum his story was not believed. He was sent to the Western Infirmary in Glasgow later, when the coin was seen with X rays and removed. No permanent injury to the gullet was observed.

Dr. BOOTH asked if it was not rather unusual for a halfpenny to stick in the œsophagus of a boy of eleven years of age.

Dr. LITHGOW had seen some years ago a boy in whom a half sovereign had stuck in the œsophagus. He removed it in a coin-catcher. In another case he had removed a halfpenny. He did not think, within limits, that the size of the coin made much difference.

Dr. PORTER, in reply, said the patient was not a child of eleven: he was four when he swallowed the coin. The boy remained a fortnight in hospital and gained 5 lb. in weight. The point that struck him especially was that dysphagia was not complained of at all, but only indefinite gastric symptoms.

Hoarseness from Birth; Patient shown; Opinions invited.—
J. K. Milne Dickie.—B. M'K——, aged seventeen, seen first on June 9, 1913. Complained of sore throat. Had been hoarse from birth. Birth had been precipitate. *Condition at time of examination:* Slight tonsillitis and pharyngitis. The left vocal cord showed only very slight movement. On middle of upper surface of cord there was a small red oval area. Slight subglottic swelling in front. Right cord moved freely. Nothing abnormal in heart or lungs. X ray negative. Two months later condition still the same.

Dr. DOWNIE remarked that there was here a chronic pharyngitis. There appeared to be pus on the cord.

Dr. SYME said it had appeared to him that there was thickening of the upper part of the left cord, but it did not seem to be sufficient to cause the hoarseness for such a long time. It was a condition one would have expected to pass off. He suggested that the irregular, pearly thickening was a lymphangitis due to some interference with the lymphatic return. There was some pus below the cords.

Dr. BROWN KELLY thought there was a tiny nodule on the left cord and indications of one on the right.

Dr. MILNE DICKIE, in reply, said the reason the case was brought forward was that when the patient was first seen the left cord was fixed. First of all, some injury at birth causing paralysis on the left side was suspected. She was kept under observation and treated with silver

nitrate; after some months the cord began to move. The patient, who is a weaver, works in a very dusty atmosphere—fluffy dust—and uses a green dye. Her condition had changed since she was last seen.

Laryngeal Stridor; Tracheotomy; Recovery.—J. K. Milne Dickie.—Mrs. S—, aged forty-three, seen first on June 19, 1913. History of bronchitis and asthma for six weeks with loss of voice and shortness of breath. *Examination*: Great inspiratory stridor with some cyanosis. Vocal cords in apposition; right cord could be abducted slightly; left one not at all. False cords swollen. Admitted to hospital. Tracheotomy performed during the night. A few days later cords could move quite freely. No shortness of breath.

Seen again on July 7, 1913. Larynx normal. Scar of tracheotomy wound seen below aperture of larynx. No discomfort at all now.

Dr. ADAM said the patient stated that her asthma dated back some years. She also states that she had distinct sore throat before the attack of stridor came on. He did not think it was connected with the asthma. Asthma rarely caused spasm of the larynx in adults, though laryngismus was a common form of it in children. He would like to know what the effect of the general anæsthetic was on the stridor. He thought the vocal cords were swollen.

Dr. SYME asked if there was not some connection between the bronchitis and the laryngeal stridor. He thought it probable that in this case there was an acute infection and enlargement of the bronchial lymphatic glands, and that by irritation of the recurrent nerves laryngeal spasm and stridor had been caused. As the acute enlargement of the glands subsided the stridor disappeared. The loss of voice was suggestive of spasm rather than of abductor paralysis. He asked if the patient had had any attacks of vertigo.

Dr. BROWN KELLY had shown a case before the Society a year and a half ago of a child in whom the vocal cords, after having been together for months (? adductor spasm), subsequently moved normally. Possibly in this case also an adductor spasm had been present, and not a paralysis.

Dr. WHITEHOUSE asked if there had been any other treatment, and how long the patient was in hospital before operation.

Dr. MILNE DICKIE, in reply, said the patient was admitted at five p.m., and the operation was done in the early hours of the morning by the Resident. No anæsthetic was used. Personally he thought Dr. Syme's suggestion the most likely. The patient had a distinct amount of bronchitis as well as the laryngeal condition; she had a good deal of secretion. The false cords were swollen, but not enough to cause any real obstruction. No other treatment was carried out at all; the patient was only in hospital for about a week altogether. She could breathe perfectly normally through a natural opening after two days; since then there had been no trouble at all. She has no general nervous affection as far as could be made out to account for the condition.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

May, 1913.

(Continued from p. 44.)

Eight Cases of Purulent Meningitis, Operated upon by the Haynes Method, with Post-mortem Findings in Five.—Ewing W. Day (Pittsburg).—During the past year the writer has treated twelve cases of suppurative meningitis, nine of them by drainage of the cisterna magna. Two of these were secondary to lobar pneumonia, the infecting meningeal organism being pneumococcus; two followed fractures of the base of the skull, involving the roof of the naso-pharynx, through which there was pneumococcic infection; five were of otitic origin, including two cases that had a purulent labyrinthitis, the organism being *Streptococcus pyogenes* in three of these, and a mixed infection in the other two. It is interesting to note that, in four of these cases with streptococci in the meninges, two showed staphylococci among other bacteria, but no streptococci in the pus from the ear and mastoid.

Feeling that early operation is an important factor in success in these cases, an attempt was made to estimate the probable lapse of time between the invasion of the meningitis and operation. In one case, a baby, the cisterna magna was drained thirty-six hours after the first signs of fretfulness, and twenty-one hours after the first convulsion. In another case, with chronic purulent otitis media and acute labyrinthitis, under close observation in the hospital, with cerebro-spinal fluid free from bacteria, temperature normal for two days, and without vertigo or pain, patient had a chill and a temperature of 102° F. at 2 p.m., and was operated on at 4 p.m. In this case it was believed that only a few hours intervened between the invasion of the meningitis and the establishment of drainage. Another case, under hospital observation, was operated upon in from twenty-four to thirty-six hours after the onset of the meningitis. One case was in an advanced stage of the disease and in a hopeless condition when admitted to the hospital, and in the remaining five operation was performed in the third or fourth day of the disease. In only one case was there any evidence of oedema of the fundus veins, out of four cases that were under observation before the meningitis was diagnosed, and in which the fundus was examined daily. Blood-pressure was taken twice a day, and in no case could there be demonstrated any constantly increasing pressure. The length of time between operation and death varied widely. In the cases operated upon early the interval was one, three, and twenty-two days respectively; in those operated upon after three or four days of illness the interval was eighteen hours, thirty hours, two days and four days. In the late hopeless case it was three days. In the case which recovered the period of invasion was indefinite and the diagnosis not positively proved.

The establishment of free drainage for the cerebro-spinal fluid was without special difficulties, except in one case due to an unsuspected abscess of the right cerebellar lobe crowding that lobe across the median line. In seven cases the amount of fluid drained in twenty-four hours averaged about 8 oz. In one case, in which the dressings were weighed before being applied and again immediately on removal at the end of twelve-hour periods, there was a daily drainage of cerebro-spinal fluid of

5440 grm. (11½ oz.) for a period of eight days, no allowance being made for evaporation. In the case that recovered there was an almost dry cisterna magna, with a probable flow of not more than 2 or 3 oz. in ninety-six hours.

The symptoms present in seven cases were those characteristic of meningitis. In two, where the meningitis was secondary to fracture of the base of the skull, there were extreme restlessness and, later, violent delirium, the symptoms being diminished by draining the cisterna magna. In all cases but one, which gave a dry tap, the diagnosis of meningitis was confirmed by lumbar puncture.

Following the operation in all save the two which were secondary to fracture of the skull, there was considerable deviation from the usual clinical course of suppurative meningitis. Suppurative meningitis treated by drainage of the cisterna magna presents three well-defined periods: (1) the period of invasion, (2) the period of improvement, (3) the period of sepsis. An explanation for this clinical course is as follows: The cerebro-spinal fluid from its course in the lateral ventricles passes to the brain surface *via* the third and fourth ventricles and cisterna magna, thence through the dural spaces to disappear mainly into the venous circulation of the superior longitudinal sinus. In meningitis, as this fluid flows over the infected areas, it gathers the products of the infected areas and carries them in a steady stream into the venous circulation, and this produces the relatively constant high septic temperature characteristic of the disease. When the cisterna magna is opened, the fluid is deviated from its normal course and no longer passes over the infected brain surface, but leaves the skull at the cisterna magna, the toxins no longer being washed into the circulation. This results in a fall of the temperature, the relief of the brain-pressure, and the period of improvement. All the infection tangled up in the meshes of the arachnoid spaces does not drain back to the drainage-opening, and these remaining foci Nature is unable to overcome. The period of improvement will continue until absorption from these areas ushers in the period of sepsis.

From the clinical observation of the nine cases, and from the *post-mortem* findings, the following conclusions were reached: Drainage of the cisterna magna hinders the development of a diffuse meningitis over the hemispheres, prevents the accumulation of inflammatory exudate in the subdural spaces, but appears to have no effect upon the accumulation of pus in the pia arachnoid, and does not influence the progress of the infection at the base of the brain. The accumulation we found present in all *post-mortems*, extending from the optic commissure backwards over the crura, pons, medulla and the upper anterior portion of the spinal cord.

Dr. SAMUEL J. KOPETZKY thanked Dr. Day for his fair and unbiassed criticism of the Haynes method of operation. The criticism with reference to the dangers of the method had not been borne out in Dr. Day's experience nor in his own. It has never been claimed that drainage of the cisterna magna is a cure for meningitis; it was stated that it is a method of controlling the pressure factors, and these, once in control, then other agents—sera, drugs, or antitoxins—can be used with hope of better success than is now obtainable in these cases where the pressure factors dominate the clinical picture. The dryness of the cortex reported by Dr. Day must not be taken as a bad sign,—one comes across the same experience in operations for tumours, and it is not found to deleteriously affect the final results. The high mortality in our operative cases of meningitis is striking, but one should remember that the mortality

percentage in all intracranial work is high, and this in itself must not be considered against the procedure. Dr. Day's division of the periods of meningitis is a distinct advance. His work of estimating the onset of the disease, however, is not agreed to by the speaker's findings. There is a period when the patient presents no clinical symptoms whatever on which a diagnosis can be made, and the speaker insisted that the chemical tests would give the earliest possible indication of the presence or absence of a meningitis. If the operation under discussion is to accomplish anything at all it must be done in the very earliest possible period of the development of the disease. He cited a case of Dr. McKernon's in which the patient entered the hospital on March 14, with no other symptoms than headache. The diagnosis of meningitis was made by chemical test on March 15. The first clinical sign of the disease in the form of a Kernig appeared on the 19th, and on the 21st the child was dead. In this case when the Kernig appeared it was too late, in the speaker's opinion, to undertake the operation. Regarding the lack of finding of an advance in blood-pressure and signs in the fundus of the eye, the speaker did not claim that all cases of meningitis present these, but did contend that when present they are indicative of increased cranial tension, and his contentions are supported by the observations of Harvey, Cushing and others. He cited a case of Dr. Ducl's, said by him to be hopeless from the start, in which the blood-pressure and vaso-motor changes were found only a few hours before death. With reference to the treatment of meningitis, attention was called to the use by McKernon and others of urotropin, which had been successful in a certain number of cases, the drug having been used empirically. Recently a test has been devised which will show whether or not urotropin is broken up into free formaldehyde; for unless it is broken up into free formaldehyde, it is useless to continue the administration of the drug. This test consists of the following: Phenolhydrozin, 5 per cent. sol., 3 drops; sodium nitro-prusside, 5 per cent. sol., 3 drops; sodium hyroxid, saturated sol., excess; added to 1 c.c. of cerebro-spinal fluid. Unless this shows the green colour indicative of free formaldehyde, it is useless to continue giving urotropin.

Dr. FRANCIS P. EMERSON reported one case of temporo-sphenoidal abscess with meningeal symptoms, in which the symptoms were general and urgent, and the Haynes operation was done at once. The following day the usual mastoid operation was performed on the right side, and a temporo-sphenoidal abscess evacuated through the tegmen. The patient, A. McF—, was admitted October 26, 1912, with the following history: Male, aged twenty-two; chronic otorrhœa of the left ear. There was a chronic suppurative process until he was aged fourteen. One week ago an otalgia was followed by an increase in secretion. The patient had a marked general headache for one week, with vertigo and projectile vomiting. There had been soreness in the neck and back, with cramps in the stomach for twenty-four hours. The sensorium was cloudy. There was a rotary nystagmus to the right. The pupils were equal and reacted to light. There was a marked rigidity of the neck. The knee-jerk was absent. Kernig marked and *tâche cérébral* present. Babinski and ankle clonus not present. The cerebro-spinal fluid was very cloudy, but not under pressure. The white count was 31,400. Urine negative. The fundus was also negative. Blood-pressure 125. Cultures from the cerebro-spinal fluid were contaminated. The patient made an uninterrupted recovery.

Dr. JOSEPH C. BECK reported having operated upon seven cases since last year, details of which were recently presented in Chicago, before the

local Oto-Laryngological Society. Dr. Day's work corroborated his own findings. Out of the seven cases reported one had recovered. The correctness of the diagnosis of diffuse suppurative meningitis might be doubted in this case. It followed septic sinus thrombosis of the pneumococcus type. The patient, a young girl, is now perfectly well, seven months after the operation. Another case was parallel with that reported by Dr. Emerson. The diagnosis was made with all the clinical and chemical tests. In this case there was an increase in the cellular elements, unlike the one which recovered. This patient, a man, could not be put in the face-down position, ceasing to breathe as soon as this position was assumed. He died the night of the operation. At autopsy a large temporo-sphenoidal abscess was found. The operation, of course, did not relieve this abscess, which was the cause of death. He added that the patient who recovered had a marked Kernig.

Dr. LESTER MEAD HUBBY said too much stress must not be placed on blood-pressure findings, as a rising blood-pressure occurs, in his experience, only in the very beginning of a meningitis, previous, in fact, to the appearance of the Kernig, Babinski, stiff neck and Brudzinski phenomena. The disappearance of high blood-pressure must be accounted for by the depressing action on the vaso-motor centres of cholin, neurin, and possibly other toxins collecting in the cerebro-spinal fluid. The question as to whether to do the cisterna drainage only should be answered in the negative. The cisterna and the site of the manufacture of the germs should be drained with the greatest possible speed consistent with the least amount of jarring and the least amount of blood-loss. His experience with the Haynes operation was limited to seven cases—one of his own, and the others of other observers. All were fully developed meningitis at the time of operation, and none recovered. Three were nearly moribund at the time of operation and died within twelve hours after the operation. The other four lived three, five, five and a half, and nine days after the operation. The interesting point in his case was the disappearance of the copper-reducing dextrose and the presence of lactic acid in the spinal fluid at least six hours previous to the appearance of Kernig, Babinski, retracted head, etc.

Dr. KLOTZ, of Pittsburgh, had the opportunity of studying the pathological conditions of the cases reported in Dr. Day's paper. In the autopsy findings of septic meningitis several points stand out very prominently. In the unoperated cases there is always evidence of collection of much inflammatory exudate upon the surfaces of the brain and at the base with the accumulation of excess fluid in the subdural spaces. In similar cases that have been operated upon, the subdural spaces are free from fluid and are quite dry. There is no evidence of pressure from a collection of fluid in the subdural spaces when the operation into the cisterna magna has been carried on. In other words, this operation gives excellent drainage of the subdural spaces. On the other hand, it is noted, however, that such drainage does not assist in the removal of the exudate in the pia arachnoid, and in the cases studied there was no evidence that the opening of the cisterna magna had any unfavourable effect upon the course of the disease.

Dr. DAY, in closing the discussion, emphasised the fact that in presenting this paper he had expressed no opinion whatever with reference to the merits of the operation, and that whether the operation be a good one or a bad one it had nothing to do with the scope of the paper. The greatest improvement in the cases cited was evidently due to the relief of pressure. In one case, in which the patient lived twenty-one days after the

cisterna was opened, the operation was justified, if for no other reason than that it permitted the father to see the child with clear mentality for nine days before death. There could be no doubt concerning the fact that the operation does relieve pressure. The two abscess cases mentioned by Dr. Beck and Dr. Emerson were probably not cases of diffuse suppurative meningitis but circumscribed. Three years ago he had reported three cases of suppurative meningitis cured by drainage of the subdural space. Two years later one of these patients returned, with re-filling of the abscess-cavity and death. Autopsy performed. Failure of methylene-blue under pressure to penetrate certain areas of the dura indicated that the former meningitis had been circumscribed, and it was hardly just to include such cases in estimating the value of the operation under discussion. There is much yet to be learned with reference to the circulation of the cerebro-spinal fluid. The amount of drainage obtained by operation does not represent the normal secretion; it represents the most that can be secreted under artificial conditions. The arterial pressure must be higher than the pressure of the cerebral fluid; likewise, the pressure in the venous circulation must be lower than that in the arterial circulation. If the arterial pressure is equal to the pressure of the fluid there will be no secretion. When the cisterna magna is opened the amount of fluid obtained represents the fluid secreted with zero pressure in the ventricles. The operation has not been successful in saving life. It carries the patient over the dangers of cerebral pressure only to die from sepsis. He believed Dr. Kopetzky to be wrong when he said that by making the diagnosis in the early stage the drainage operation will effect a cure. Even if the cases are seen early and the disease demonstrated by chemical tests, there will be points or puddles in the arachnoid spaces which cannot be drained through the cisterna magna. The infected fluid from these areas will eventually reach the undrainable area at the base and the formation of pus will follow.

(To be continued.)

Abstracts.

PHARYNX.

Freedman, L. M.—On the Function of the Tonsils. "Annals Otology," vol. xxii, p. 188.

The author concludes that the tonsil has a function, but probably only in the early years of life, and assumes that there is other tissue in the body, as, for instance, the lymph-glands, which have the same function—mainly protective. Removal of the tonsil, therefore, does not remove from the body any organ or tissue absolutely necessary to the system; but, if not diseased, its removal leaves the individual with one defence less.

Macleod Yearsley.

Wilson, J. Gordon, M.A., M.B. (Chicago).—The Significance of Plasma-cells in the Tonsil. "Journ. Amer. Med. Assoc.," August 2, 1913.

From a review of the literature and his own investigations, the writer considers that plasma-cells are normally present in the tonsil, and that with the absorption of toxins, either from the crypt or from extra-

tonsillar areas through the lymph-streams, there is a marked increase in their number. Their localisation in the tonsil does not mean a diseased organ, but an organ that is reacting to disease and striving to protect the body. The early occurrence of plasma-cells in the tonsil is no argument for early removal, but rather for the putting right of any faulty metabolism which has caused their increase.

Dr. Gordon Wilson draws the following conclusions: (1) Plasma-cells are derived from lymphocytes and are engaged in removing and utilising cell material which has broken down. (2) If it be pathologic to destroy albuminous bodies and toxins from metabolic processes, then plasma-cells are pathologic. (3) They are not degenerated cells, but cells actively engaged in combating the toxins which pass through adenoid tissue. (4) Their presence indicates that the tonsil is functionally active. And (5) their presence in excess shows that we have some focus of disease, but not necessarily a local one.

Birkett (Rogers).

Ingalls, E. Fletcher (Chicago).—What Relation, if any, have the Fauical Tonsils to Pulmonary Tuberculosis? "Journ. Amer. Med. Assoc.," July 12, 1913.

Relying on an exhaustive study of the literature and an examination of his own records, Dr. Fletcher Ingalls states that affections of the tonsils are much more frequent among non-tuberculous than among tuberculous patients, but that cervical adenitis, while comparatively infrequent (4 per cent. only) in tuberculous patients, is much less common in non-tuberculous patients: only 1 per cent. of the cases of cervical adenitis showed even the slightest evidence of disease of the tonsils. Research during the last ten years has proved that tubercle bacilli may enter and pass through the tonsils and cause disease of the cervical lymph-nodes while the tonsils themselves may escape all injury; and that there is no direct connection between the cervical lymph-nodes and the pulmonary lymphatics, and, therefore, that involvement of the lungs associated with cervical adenitis must be a systemic infection rather than a result of the disease of the lymphatics. The writer concludes with the statement of Jonathan Wright, "To tell the truth, I do not believe there is any relation between the tonsils and pulmonary tuberculosis"—a view with which he is in hearty accord.

Birkett (Rogers).

NOSE.

Mahu, G.—Modern Treatment of Ozæna. "La Presse Médicale," January 4, 1913.

Generalities: The author defines ozæna as a specific nasal catarrh, which may extend to the pharynx and larynx, characterised by the formation of fœtid adherent crusts and attended with atrophy of the mucosa and bony elements without ulceration. Nasal respiration is not always commensurate with the calibre of the cavities; on the contrary, many ozænatous subjects are mouth-breathers. The affection, which is twice as common amongst females as males, generally appears at puberty, but it has been met with in children from two to five years of age. Baumgarten has observed it in sucklings. It rarely develops after thirty (MacKenzie, Semon). The comparative frequency of the disease amongst various classes of society and occupations is much debated. Heredity, formerly supported by Fraenkel, is still admitted. As to the question of infection and contagiousness, Loewenberg and Perez, who have isolated

bacilli believed by them peculiar to ozæna, with Vaquier and Lermoyez regard ozæna as a specific infectious malady. Cabouche and Lombard hold it to be tuberculous. Belfanti and Della Vedova have incriminated diphtheria, and Gaucher considers all ozenatous subjects syphilitic. The theories of Zarniko, Cholewa and Cordes, Zaufal, Grünwald, Hajek and Jaques are also cited. Diagnosis: Though other nasal affections are associated with fœtor, ozæna is easy of distinction. Syphilis is accompanied by ulceration. In the pre-tubercular coryza of Moure, or paratubercular of Lannois, the crusts are thin and yellowish and unaccompanied by fœtor. Concerning treatment, until twelve years ago ozæna was deemed incurable, and surgeons were content with palliative measures, irrigation, etc. In 1902 Moure and Brindel conceived the idea of reconstructing the turbinated bodies by injections of liquid paraffin. In 1903 H. Smith and G. Connell improved this procedure, and rendered it practical by using cold softened paraffin below fusion point. They were followed by Broeckaert, others, and the author, who, after studying the question on over 1000 patients in Lermoyez' practice at St. Antoine's, has definitely adopted the method. Paraffin in this form cannot enter the vessels, and is therefore free from serious accidents, phlebitis, etc. Following the observations of Lermoyez (1899), Dundas Grant (1902) and Horeau (1908), on some cases of abeyance of the nasal functions, but with nasal sufficiency, Robert Foy (1910), having noticed that the majority of patients suffering from ozæna breathed little or not at all by the nose, endeavoured to regenerate the mucosa and restore its functions by its indispensable and normal stimulant, atmospheric air. In opposition to Zaufal's theory, which attributes desiccation of the crusts to excessive ventilation of the fossæ, he demonstrated that there was a deficiency of the air current in ozæna, and that on subjecting the nasal cavities to strong currents of compressed air, the mucosa regained its moisture in spite of the capaciousness of the fossæ. By supplementing this treatment with daily respiratory exercises carried out by the patient, cures result, if by that is understood the suppression of fœtor and crusting in the absence of lavage. The author remarks that, at first sight, this principle seems to be opposed to that of Moure and Brindel's treatment, since the latter apparently corroborates Zaufal's theory by ascribing improvement to diminishing the calibre of the nasal fossæ. With Broeckaert the author thinks this is not so. Paraffin injections not only act in this way, but perhaps by modifying the secretion and compressing the glands so as to hinder the production of purulent fœtid fluid. The two methods of treatment are reciprocally complementary. Friability and atrophy of the mucosa frequently precludes the employment of paraffin injections, but after forced aëration and respiratory exercises the membrane becomes so strengthened as to render the procedure possible. In the event of failure with the methods described, the author mentions a third, which consists in lavage and insufflation of powdered lactic acid ferment; this, it is stated, will lessen or even abolish fœtor in a large proportion of cases. The technique of the several methods of treatment and the various instruments at one's disposal for the injections, etc., are very fully described, accompanied by illustrations.

H. Clayton Fox.

Wright, Jonathan.—Atrophic Rhinitis in its Historical, Ætiological and Histological Aspects. "Laryngoscope," June, 1913.

A very full account of the present knowledge of this condition. The author is of the opinion from his histological researches that the most

significant change in structure is the thickening of the periosteal layer, which produces atrophy of mucous membrane and bone by strangulation of the nutrient vessels, this thickening or fibrosis being due to an antecedent intra-nasal inflammation or constitutional dyscrasia.

The changes produced are: (1) Metaplasia and cornification of the epithelium. (2) Round-cell infiltration. (3) Destruction of blood-vessels and glands. (4) Destruction of the elastic fibres. (5) Absorption of bone. (6) Destruction of the smooth muscle-fibres in the stroma. (7) An excretion or transudation to the surface of lipoproteids, derived from tissue-waste and perverted gland function, which form the discharge. This destructive metabolism ceases with old age and so brings about a cure.

A. J. Wright.

LARYNX.

Colombel.—Chronic Laryngitis of Smokers. "*Arch. de Laryng., etc.*," November, 1910.

Tobacco is one of the most frequent causes of acute and chronic inflammations of the laryngeal mucosa. Acute attacks of laryngitis, however brought on, show less tendency to clear up in this class of case. The chronic condition is always introduced as the summation of a series of slight subacute attacks in which the whole of the respiratory tract is affected. The condition is obviously more common in men, and will be greatly increased where any other source of irritation is present, such as dust or the use of strong alcoholic beverages or where any already existing lesion such as syphilis, cancer, tubercle is present. In syphilitic subjects tobacco is particularly harmful and indefinitely prolongs the contagious period. The characteristic symptom of the condition is alteration of the voice. Dysphonia may vary from slight hoarseness to extreme roughness of the voice but seldom goes on to aphonia. The laryngoscopic appearance is that of chronic laryngitis of the pachydermia variety. The mucosa is somewhat oedematous and this hinders the close approximation of the cords, thereby determining the alteration of the voice. The vocal cords are usually somewhat rosy coloured and occasionally present small ulcerations of a somewhat punched-out character. Histologically there is a considerable increase in the epithelial tissue, particularly of the interarytænoid region, amounting to a pachydermia laryngis. The nose and pharynx show similar hypertrophic changes. The treatment consists in the removal of the cause, and in addition, if necessary, the cauterisation of any hypertrophic areas should these still exist.

J. D. Lithgow.

Winckler, Dr. Ernst (Bremen).—Laryngeal Tuberculosis in Cases treated by Artificial Pneumothorax. "*Zeitschr. f. Laryngol.*," Bd. vi, Heft 2.

Forlanini's method is indicated if the patient has unilateral cavity formation which resists ordinary methods, if at the same time there are no old firm adhesions between the two layers of the pleura. Under careful observation with the manometer sufficient nitrogen is introduced into the pleural cavity to completely compress the affected lung. This proceeding is followed by great diminution in the amount of sputum and also by a fall in the temperature and a marked increase in appetite and weight. If the sputum again increase or the temperature rise the compression must be renewed. The treatment is greatly aided by a good radiogram of the chest and is only suitable for the third group of cases,

according to Turban-Gerhard's classification. Laubs has shown that only 10 per cent. of cases in the first stage of phthisis suffer from laryngeal tubercle, 17 per cent. of cases in the second stage, and 73 per cent. in the third stage. Forlanini himself states that laryngeal, abdominal and renal tuberculosis are contra-indications. From *Brauer's Festschrift* Winkler abstracts four cases, in all of which artificial pneumothorax was followed by cure or great improvement of laryngeal tuberculosis. He also notes three cases from Forlanini's clinique, in which artificial pneumothorax was combined with local treatment of the larynx; all of these gave fairly satisfactory results.

Winckler's own cases are not so satisfactory. Death resulted in three of the four cases, while in the remaining one, in which the galvanocautery was also used, the final result is not reported. In three further cases, in which the larynx was normal before artificial pneumothorax, it became diseased during this treatment.

J. S. Fraser.

EAR.

Raoult, A. (Nancy).—Auditory Re-education: Remote Results of Auditory Re-education. "Arch. Internat. de Laryngol., d'Otol., et de Rhinol.," July–August, September–October, 1913.

Auditory re-education is sometimes reproached with producing only passing improvement of the hearing, which rapidly becomes as bad as ever; but this is not the experience of Raoult, as in the majority of cases where the electro-phonoïde of Zünd-Burguet was employed, the improvement after the cessation of the treatment was maintained, and was often even progressive.

In the present paper full clinical notes are given of thirty-five cases, seen six months after the cessation of treatment by auditory re-education. Seventeen of these are from Raoult's own practice, thirteen from that of Zünd-Burguet, and five from Helsmoortel. Raoult notes that in a few of these the patients thought there was no improvement, but on actual examination in some of them distinct improvement was noted, while in others a slight diminution of the acquired hearing-capacity was present.

This is explicable on the assumption that the increase in hearing had caused the friends of the patients to adopt the ordinary instead of the raised voice which they formerly employed, thus making things more difficult even where the hearing was slightly improved.

It is therefore necessary, in order that reliable observations can be made, that the hearing should be tested under identical conditions, both before and after treatment.

Nevertheless, it is often necessary, especially in the aged, or where there is this marked diminution of hearing, that the treatment should be resumed again after a period of rest, as these cases show a distinct tendency to regress after a longer or shorter period unless put under another course of treatment. It goes without saying that one must endeavour to find and treat any persistent cause of progressive deafness in the nose or nasal pharynx which would neutralise the effect of the re-education. Such remote factors, in the stomach and intestines, intoxication, excessive fatigue, mental depression, have a similar effect. In so far as these cases resist direct treatment, there must be a proportionate increase in the number of re-educative *séances*. The clinical cases are well worth reading, as they are models of careful recording, and they fully support Raoult's thesis.

J. D. Lithgow.

Lavrand, H. (Lille).—Phonatory Massage in Progressive Deafness. "Arch. Internat. de Laryngol., d'Otol., et de Rhinol.," August, 1913, p. 140.

Under this general title Lavrand considers that the question is not scientifically prejudiced. Diminution of hearing seems to be difficult to measure exactly, for the results obtained vary considerably according to the numerous and much-disputed methods employed. Those who do not sufficiently understand the speech of ordinary conversation we consider deaf. Deafness is a term one is specially apt to attach more particularly to the anatomical conception, but the physiological and functional causes must not be forgotten. Practically, cases may be divided into two groups. (1) Cases where there exist alterations of the ear, nasopharynx and nasal fossa, which are accessible to therapeutic measures. This region should be the first care of the otologist, as very favourable results may follow the treatment. (2) Cases of progressive and intractable deafness where either no definite alterations of the ear and its annexes can be made out, or, if present, are either not benefited themselves by treatment or are followed by no improvement in the hearing when so treated.

To this second class the present study is directed. Here the aurist is powerless in the presence of a condition very discouraging both to himself and to the patient. This group constitutes the problem of otology.

Putting aside the purely anatomical idea, one has recently attempted to substitute rather a physiological and functional idea in the pathology and therapeutics. Sceptical at first, but eventually set going by the published results and for want of something better, Lavrand tried in some intractable cases auditory re-education, but only after having failed with the usual classical methods. Five such cases are described and they certainly show most encouraging results. In all of them any apparent causal condition was either intractable, or, if satisfactorily treated, was followed by no alteration in the hearing. The instrument used in these cases was the kinesiphone of Dr. Maurice. Lavrand sums up: cases of deafness which are not amenable to ordinary therapeutic methods show more or less appreciable improvement under phonatory massage. Indications for this treatment are not yet clearly defined, but its utility should not pass unnoted. For, although it cannot pretend to cure all cases of deafness, it constitutes a real progress upon the present methods of treatment for that form of progressive deafness attributed to otosclerosis. It increases the hearing power when other means of treatment have failed.

J. D. Lithgow.

REVIEWS.

Map Scheme of the Sensory Distribution of the Fifth Nerve (*Trigeminus*) with the Ganglia and Connections. By L. HEMINGTON PEGLER. London: Baillière, Tindall & Cox, 1913.

Should anyone entertain doubts as to the statement that we are "fearfully and wonderfully made," these would be dispelled at once by an inspection of the complex anatomy of the fifth nerve as laid out in Dr. Pegler's "Map Scheme of the Sensory Distribution of the Fifth Nerve."

The author has been led to carry out what has obviously been a labour of love by a desire to explain to himself and to others the *raison d'être* of headaches and other sensory disturbances which his clinical observations have led him to attribute to the reflex effect of diseases in the nasal cavities. The radiations of nervous disturbance in the animal, or at all events in the complex human being, can hardly in every case be followed out in accordance with the anatomical distribution of nerves in the same way as currents of electricity or rays of light in the physical world, but such an elucidation of the anatomical network as Dr. Pegler has given us helps us a long way in the direction of the truth.

This work is a monument of industry, and from what we have seen and heard of it from others is extraordinarily free from error, the very insignificant one of the origin of the nerve to the internal pterygoid muscle being apparently the only one that has been detected. The relations and connections of the branches of this great nerve with other cranial, cervical and sympathetic nerves are made clear by the adoption of a remarkably well-thought-out colour scheme. Among the most interesting features is an inset showing the relations of the sensory branches of the fifth to the long descending root in the spinal cord where it enters into relationship with the upper cervical nerves, and notably those that supply the occipital region. The nomenclature is not materially altered from what has been familiar to the student of anatomy for a number of years, and any change is for the better. Thus, the oculo-nasal nerve appears here as the naso-ciliary. The cutaneous areas supplied by the branches are well mapped out, and anyone possessing this chart could not possibly forget that the apex of the auricle derives its sensory supply from the small occipital nerve. It might at first sight seem that the form in which the chart is arranged is a somewhat cumbersome one, but it is difficult to see how it could have been constructed on a smaller scale without the sacrifice of the extraordinary clearness which is one of its chief merits. It occupies a large table when spread out, and in map form for hanging on a wall is naturally adapted for the class-room rather than the private house. We feel sure that before long no clinic or anatomical class-room will be considered complete without it. It is highly creditable to our specialty that one who is so fully occupied in its practice should have devoted so much labour and ability to the preparation of a work of such accuracy as this.

Dundas Grant.

The Relation of the Lachrymal Organs to the Nose and Nasal Accessory Sinuses. By Prof. Dr. A. ONODI. Pp. vi + 66, and 45 plates. London: John Bale, Sons and Danielsson, Ltd., 1913.

The subject-matter of Prof. Onodi's latest monograph published in this country is sufficiently indicated by the title, and in stating that the work is worthy to rank with the best of Prof. Onodi's previous publications on the anatomy of the nose and nasal accessory sinuses we are offering high praise. The scanty information afforded by text-books of anatomy, rhinology and ophthalmology on the region that this atlas-monograph deals with becomes strikingly evident when one realises how much new and practically useful information this work conveys. True, some of the plates have been published before, but even these are new in the sense that they are used afresh to illustrate new points pertaining to the relations of the tear-ducts to the nose.

The descriptive text is short and to the point, and the sixty-six pages comprise the German text, which is followed by the same translated

into French by Dr. Bellin, and then the English translation by Dr. Dan McKenzie, and in each case the translators deserve thanks for their accurate and readable rendering of the original.

P. Watson-Williams.

Principes d'Anaconsie (Rééducation Auditive). By A. ZÜND BURGUET. Preface by Prof. M. C. GARIEL, Paris. A. MALOINE, Editeur, 1913.

We preface our review of this work with a quotation from the "Foreword" of M. Zünd-Burguet: "With regard to the medical part of the book I remain faithful to my custom of rendering unto Cæsar the things which are Cæsar's, and I have entrusted it to Dr. G. de Parrel, *ancien Chef de Clinique aux Sourds-Muets de Paris*, member of the Parisian and French Societies of Otology."

The mechanical re-education treatment of deafness has been before the public for some little time, but there does not yet seem to be any very clear opinion regarding its value. The delay in arriving at a definite conclusion on the matter is unfortunate both for the otologist and for his patient. But we do not see very well how it can be otherwise so long as the impression exists that in the camp of re-education the smoke of the incense burned to the Golden Calf is just a little too plainly discernible. This impression may, of course, be erroneous, but so long as it prevails the re-educationists need not be surprised if otologists in general are cautious in recommending their patients to submit to the treatment. That the advocates of the re-education method have to contend with some kind of prejudice, the authors of this book seem to be fully aware. But what they do not seem to understand is, first of all, the nature of this prejudice, and secondly, how it may be overcome. As to the first point, we have already spoken out quite frankly. With regard to the second, why should not the proprietor of the mechanical patents present or lend his instruments to some well-known ear clinics for trial? The results would be openly published without fear or favour.

In the book now under discussion there is no evidence that this or anything like it has been done. All that we have got here is the favourable experiences of one or two individual workers, whose sincerity we do not doubt, but whose judgment we cannot vouch for. The following is quoted from p. 147 of the book. The section deals with the effects of the treatment.

"Circulatory Apparatus.—We have seen that the acoustic exercises have the effect, easy to discern at the first *séance*, of provoking a hyperæmia of the organ, due to a vaso-dilatation. This vaso-motor action is not limited to the ears. It extends further, and appears to exercise an influence upon the general circulation. We are in possession of a large number of observations showing: some, that the *menstrual flow*, after a complete disappearance lasting several months, *re-appeared* in the course of the re-education treatment; others, that the regularising of the arterial tension, the diminution of the phenomena of hypertension or of hypotension are the rule after the first ten *séances*; there are others again which prove the action of the sonorous waves upon *the troubles of the menopause*." (Italics ours.)

In the cases recorded in the book the re-education method seems to have achieved good and even striking results, but we were unable to find any case-percentages.

So that, whatever value the book may have in other respects, as a contribution to the solution of an important otological problem, it does not, unfortunately, carry us very far, and the mists of prejudice and ignorance that have clung about this method of treatment for so long a time still remain as dense as ever.

Dan McKenzie.

NOTES AND QUERIES.

At a meeting of the Glasgow University Court, held on December 12, 1913, Dr. John Macintyre was appointed a University Lecturer on Diseases of the Nose and Throat, and Dr. J. Kerr Love was appointed a University Lecturer on Diseases of the Ear.

Mr. Harold L. Whale, London, has been appointed Surgeon for Diseases of the Ear, Throat and Nose to the Hampstead General and North-West London Hospital.

We are interested to observe that what seems to be a new and commendable departure has been taken by the Western Ophthalmic Hospital, London, in appointing a Surgeon for Diseases of the Throat, Nose and Ear to the Institution.

Mr. Harold A. Kisch has been appointed to the post.

RADIUM IN DEAFNESS.

Dr. Walker Wood writes: "In the JOURNAL OF LARYNGOLOGY, RHINOLOGY AND OTOLOGY of January, 1914, in 'Notes and Queries,' there is a question by 'Retzius' as to the value of radium in the treatment of deafness. I have seen and examined many cases treated by the ultra X rays (which are practically the same as those utilised in radium treatment), and the results in my opinion are unsatisfactory. The improvement, such as it was in four cases shown at the British Oto-Laryngological Society in July last, might quite easily be explained by improvement in general health or be simple variations in hearing. Also such an improvement is obtainable in other ways than by radium."

Dr. Max Halle (Berlin) also writes: "A few days ago there was a meeting of the Otological Society, at which various reports were made from different quarters on experiments with radium, mesothorium, and with the latest *réclame*, diathermy. It came as no surprise to any person of intelligence that the reports were unanimously negative. Not a single observer had seen any result, apart from the subjective sensations of the patients. All objective experiments were absolutely negative!"

BOOKS RECEIVED.

Stammering and Cognate Defects of Speech. By *U. S. Bluemel*. 2 Vols. New York: G. E. Stechert & Company, 1913.

Kurze Praktische Anleitung zur Erkennung aller Formen des Kopfschmerzes. Von Oberstarzt *Dr. Lobedank*, Hagenau i. E. Würzburg: Curt Kabitsch, 1914. Price 2 marks.

Die Städtische Ohrenklinik, Frankfurt a. M. Von *Prof. Dr. Otto Voss*, Frankfurt a. M. Würzburg: Curt Kabitsch, 1913. Price 3 marks.

THE
JOURNAL OF LARYNGOLOGY.
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

NOTE ON THE TECHNIQUE OF THE INTRA-NASAL OPERATION FOR ANTRAL SINUS SUPPURATION.

BY P. WATSON-WILLIAMS, M.D.,

Lecturer on Otology and Laryngology, University of Bristol; Aurist and Laryngologist, Bristol Royal Infirmary.

ALTHOUGH formerly advocating strongly the advantages and necessity of extra-nasal operation for chronic antral suppuration, particularly where it was desirable to examine the antral cavity for polypi, etc., I have practically abandoned such methods of external entry since the method of operating intra-nasally here described has proved so eminently satisfactory in all but very rare cases. It is not intended, in this brief note, to discuss the relative merits of the intra-nasal and external canine fossa routes for operations in antral sinusitis, nor to enter into the various modifications of the intra-nasal operation, but to allude only to the particular method which I have employed in a large number of cases, and which I venture to think has certain great advantages over those more usually practised. The advantages obtained are:

(1) That the anterior third of the inferior turbinal body need not be removed, except in rare and exceptional conditions.

(2) That the patient can more readily blow out the antral secretions.

(3) That access is obtained to the whole of the antral mucosa either by palpation or inspection, and therefore permits of an accurate estimation of the pathological condition of the mucosa, and of the existence or absence of polypoid changes, etc.

(4) That the mucous membrane can be curetted or the cavity packed through the nares if necessary.

The essential feature of the procedure is the removal of the *anterior end of the antro-meatal wall below the line of attachment of the inferior turbinal and for a short distance above it*, as well as of the inferior antro-meatal wall as far back as may seem desirable, and quite down to the level of the floor of the corresponding nasal passage.

An aperture having been made in the antro-meatal wall beneath

FIG. 1.



the inferior turbinal, it is extended backwards as far as is deemed necessary, and, by the use of the strong backward-cutting forceps illustrated, forwards to the extreme anterior limit of the inner wall. These cutting forceps are used to cut the inner wall upwards in front of the anterior end of the inferior turbinal, if possible, though in some patients the antrum is not sufficiently developed forwards to avoid cutting just the anterior extremity of the turbinal.

But in all cases the extreme anterior portion of the inner antral wall is removed, so that a little finger passed in through the naris glides along its outer wall without interruption to the posterior face of the anterior antral wall, and can palpate the antral lining mucosa right back to the posterior wall, as well as the floor, etc.

It is not desirable to remove any part of the anterior antral

wall, as the anterior dental nerve-filaments are likely to be permanently injured in doing so, and the corresponding teeth supplied then remain insensitive. The lower part of the antro-meatal wall is then removed by angular forceps cutting downwards, and these forceps have to be strong, as at the level of the floor of the nasal passage this wall is often three sixteenths of an inch thick. The same forceps are used to clip off any masses of polypoid mucous membrane of the antrum, unless for any reason it is considered better to curette away the mucous membrane entirely. The advantage of using such forceps is that they glide over healthy or non-œdematous mucous membrane, while polypoid thickenings

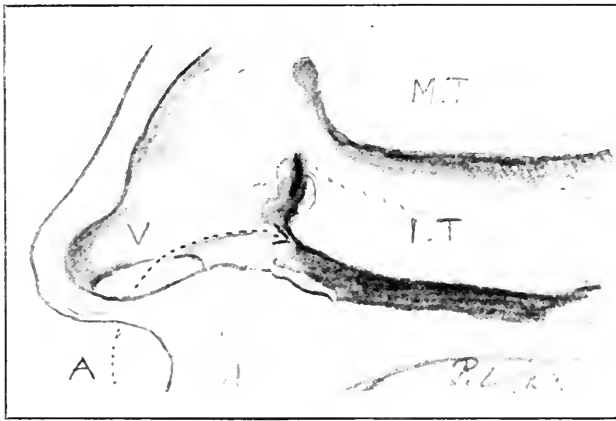


FIG. 2.—Drawing of specimen showing the author's intranasal antral operation. M.T. Middle turbinal. I.T. Inferior turbinal. V. Vestibule. A leads through the naris to the anterior part of the antral opening. The dotted line on I.T. indicates the upper margin of the inferior meatal wall excision.

are grasped and removed. Finally, if the inferior turbinal projects and narrows the entry to the nasal passage it is pressed outwards, fracturing the turbinate bone near its base, so as to make the turbinal as far as possible replace the removed portion of the antro-meatal wall. This usually avoids the necessity of removing the anterior third of the turbinal, while preserving a useful structure. The anterior upward extension of the entrance made to the antrum, as shown in the drawing, while giving very free entry at the time of operation, soon narrows, and, in fact, closes as the wound heals.

In some patients the anterior part of the nasal passage is much narrowed by the encroachment of the nasal process of the superior maxilla, particularly the anterior border; in such cases the anterior border is shaved down by the backward-cutting forceps, and in

extreme cases I have found it better to cut away the lower part of the nasal process and thus slightly encroach on the anterior antral wall, so as to gain a freer nasal passage, care being observed to avoid any unnecessary removal of the mucous membrane, which might, of course, lead to a cicatricial narrowing sufficient to neutralise any temporary widening thus obtained.

DIRECT TREATMENT OF THE EUSTACHIAN TUBE, WITH ANALYSIS OF RESULTS IN 71 CASES.

BY J. WALKER WOOD.

IN a previous paper published in this JOURNAL (9) I made a short study of some of the pathological conditions affecting the Eustachian tube and briefly recorded the findings in 650 cases. Since that paper was written I have examined fully 500 more cases with the naso-pharyngoscope. I now propose to record my personal experiences of the direct or indirect treatment of the Eustachian tube. It is to be understood that much of this work was purely experimental with the object of demonstrating the value or otherwise of a new method of treatment. The experience now gained in the use of this instrument leads me to express the opinion that in the naso-pharyngoscope we have a valuable instrument of exact investigation—a fact not as yet sufficiently appreciated. It is a simple instrument if used in a dexterous and successful manner, but it has certain disadvantages. These are: (1) slight magnification which may cause misinterpretation of the pathological picture. (2) Limitation and distortion of the area under examination, causing the posterior lip of the tube to appear nearer to the eye of the observer than the anterior. (3) Operative manipulations upon the tube are rendered somewhat difficult owing to the magnification and distortion thus described. (4) Operative manipulations upon the tube, if carried out frequently (*i. e.* more than once or twice a week), are liable to cause a distressing rhinitis.

In order to overcome the difficulties of treatment with the Holmes' instrument, I experimented with Hays' pharyngoscope, Yankauer's speculum, and Gyergyai's instrument. My experiments seem to show first that for diagnosis and most cases of treatment Holmes' instrument cannot be excelled; secondly, Yankauer's speculum is the more valuable instrument in direct treatment of the tube when it can be used, but is much less useful in diagnosis. Only 35 per cent. of cases can be treated by the direct method of

Yankauer's (Yankauer's speculum), the others by the indirect method of Holmes (naso-pharyngoscope and Eustachian applicator).

The pharyngoscope, with its brilliant illumination, while enabling one to obtain a beautiful picture of the nasopharynx as a whole, I have found to be impracticable in the treatment of the tube. Gyergyai's instrument I first used at the time of the International Congress of Medicine (August, 1913) under the supervision of its inventor. Later I obtained an instrument, but found it less satisfactory than Yankauer's—its introduction is more difficult and the stretching of the palate is greater; also the leverage required to bring the mouth of the Eustachian tube into position for treatment is likely to cause distortion and be misleading. Patients complained more with this instrument, a complaint with Yankauer's speculum being rare if suitable cases are chosen.

Literature on the subject is already growing, and before recording my own experiences of direct treatment, I will briefly review the more important work already done.

Gyergyai in 1910 was the first to experiment with straight tubes in the direct examination of the Eustachian tube and nasopharynx, and to record his experiences. In a later article (17), February, 1913, he describes a new method of dilating the orifice and tube as far as the isthmus, by means of a dilator devised by himself. Gyergyai records six cases, five of which presumably are cases of chronic middle-ear catarrh (although not definitely stated to be such by the author), one a chronic middle-ear suppuration—active in one ear, residual in the other. In all of these cases a strikingly great improvement resulted from dilatation, but the writer does not state if his results were permanent.

Holmes (1) is of the opinion that 90 per cent. of ear cases are due to diseases in or about the Eustachian tube. Tinnitus, he says, is frequently due to the pressure of an enlarged inferior turbinal upon the anterior lip of the tube, or may be due to adhesions in Rosenmüller's fossa. Remove the posterior end, or break down the adhesions, and the tinnitus will go. Braislin (2) also found tinnitus was very often due to tubal swelling, or adhesions in the fossa of Rosenmüller. He recommends "blood-letting" by multiple incisions made in the mouth of the tube, or painting the tube with a 5 per cent. solution of silver nitrate, and breaking down the adhesions in the fossa with the finger while the patient is under an anæsthetic. A similar procedure to the last was recommended some years ago by Emerson (3), who records eleven cases in all of whom bands or degenerated adenoid masses or granules were

present in Rosenmüller's fossa. Of these eleven cases, seven were cases of chronic dry catarrh of the middle ear with tinnitus. In five cases the tinnitus was cured and was improved in two as a result of his operative procedures. Those cases which were slightly deaf were greatly improved, but those markedly deaf remained *in statu quo*. The two other cases were those of chronic middle-ear suppuration, both of over two years' duration. Recessal adenoids present. Rapid, permanent cure in both after removal.

In summary at the end of his paper Emerson arrives at the following conclusion as to the effect of treatment. He says: "Results when after-treatment is followed are particularly good in removing abnormal sensations, restoring uniform hearing without fluctuations, in the partial or complete relief of tinnitus and in the prevention of recurring salpingitis."

Holmes (4), in a later article, tabulates the effect of treatment of the Eustachian tube in eighteen cases of chronic otitis media (dry catarrh). A study of the table shows that in 8 cases the hearing was improved, in 5 greatly, by treatment. Of those 8, 5 exhibited some pathological condition of Rosenmüller's fossa, either in the form of bands, adenoid granules or adenoid remains. The other 3 were typical examples of the catarrhal conditions affecting the Eustachian tube, a class of case also amenable to treatment, although not giving results as good as those in which bands, etc., are present.

With regard to the tinnitus in these 18 cases, as a result of treatment 6 were cured and 8 were not. Briefly, then, the effect of treatment was, first, *deafness*, 18 cases treated, 8 improved, 10 unaltered; second, *tinnitus*, 14 cases treated, 6 cured, 8 unaltered.

Usually, the tinnitus is more responsive to treatment than the deafness, and in those cases where bands or adenoid granules are found in Rosenmüller's fossa one may safely give a favourable prognosis. This is also the experience of Yankauer (5), who quotes six cases of tinnitus without deafness due to excessive secretion in Rosenmüller's fossa. Four of those cases were permanently cured of the noises in the head by the direct treatment of that recess.

ATROPHIC SALPINGITIS.

The atrophic conditions of the Eustachian tube proved the most unsatisfactory in my hands so far as treatment is concerned. In some cases it is true the tinnitus has disappeared and the deafness has been temporarily improved, but generally any improvement has been evanescent. The class of case to which I refer is that in

which there is an atrophic patulous Eustachian tube with a thin, dry and bloodless mucous membrane, possible atrophy of the intratympanic structures and substance of the drum itself, which usually is unduly mobile, though it may be partially fixed together with ossicular ankylosis. These patients are usually markedly deaf and complain of distressing tinnitus. The treatment adopted in these cases has been an endeavour to improve the local blood-supply and to stimulate the inactive mucous membrane. For this purpose I have given three preparations a careful trial. They are: Iodine Vasogen 6 and 10 per cent., Mandl's pigment, and Dionin 2 per cent. The last preparation (Dionin) has been highly recommended by Dr. Randall, of Philadelphia (6), for the treatment of otosclerosis and the chronic adhesive processes affecting the middle ear. In this connection I may mention that an atrophic, widely open Eustachian tube is usually found in otosclerosis. Altogether twelve cases were treated for one month by these three different methods. In each case the mouth of the tube and the tube itself was painted as far as the isthmus every second day and a small quantity of the medicament injected into the middle ear. In addition a small dose of pot. iodide twice a day was prescribed for each patient.

The results are now given in tabular form:

	Iodine Vasogen 6 per cent. increased to 10 per cent.	Mandl's pigment.	Dionin 2 per cent.
(a) Tinnitus.	* 3 cases greatly improved; 3 slightly improved; 6 unaltered	6 cases treated are unaltered	† 2 cases tinnitus increased; 4 unaltered.
(b) Deafness.	2 cases slight temporary improvement; 10 unaltered	Unaltered in all†	1 case greatly improved; others unaltered.‡

* Two of these three cases have since relapsed (February, 1914).

† Later these cases returned to their normal condition.

‡ In many of these cases recorded as unaltered a slight improvement was noticed immediately after treatment, an improvement frequently showing an increase of as much as 10 inches for the hearing distance of the watch. In one or two cases this continued for about twelve to fourteen hours, the usual duration being only a few hours. In none was the effect permanent.

ACUTE SALPINGITIS.

From the position of the pharyngeal ostium of the tube, it is obvious that any inflammatory condition of the mucous membrane of the nose, post-nasal space or pharynx, must be particularly liable to spread to that of the tube, and later the middle ear, setting up an acute otitis.

No.	Name.	History.	Ear.	Eustachian tube and fossa.	Treatment.	Result.
1	Miss T—	Attacks of pain in ear and throat. "Stuffy feeling" in ears. Duration: off and on for 1 month.	No sign of inflammation. Anterior segments of drum fixed. Marked deafness. Watch: 3 in. acoumeter: 12 in.	Acute salpingitis. Posterior lip granular. Mucus in mouth of tube. Adenoid remains in fossa. Eustachian obstruction	Fossa curetted. Tube painted with argyrol up to 40 per cent.	Cured. Hearing impaired.
2	Mrs. B— (Canada)	Cold in head 5 days ago. Pain in ear for 1 day	Drum normal. Slight redness of Shrapnell's membrane radiating down malleus. Tympanitis. "Stuffy feeling" in ear	Acute salpingitis. Mucus in tube. Eustachian obstruction. Mucopus in Rosenmüller's fossa	Tube painted with argyrol 40 per cent. every second day for 2 weeks	Complete cure and relief of tinnitus.
3	Mr. A—	Earache for 3 days. No cause known	Drum normal in appearance. No redness. Ear is described by patient as "feeling bunged up"	Acute salpingitis	Tube painted with argyrol 40 per cent., every second day	Cure
4	Mr. P—	"Caught cold" 14 days ago. No trouble with ears before	Slight deafness and pain. Crackling in ear when swallowing. The mucous membrane of middle ear inflamed; shows through drum. Tinnitus	Acute salpingitis. Eustachian obstruction	Tube painted with argyrol 30 per cent. every second day	Cured.
5	Mr. B—	Awakens in morning with pain in ear and throat. Recent nasal obstruction	Drum catarrhal. Slight deafness and full feeling in ear. Tinnitus	Acute salpingitis. Post-nasal catarrh	Nasal obstruction. Turbinal relieved by cautery. Tube painted with argyrol 40 per cent. frequently. Post-nasal swabbing with zinc chloride 15 gr. to oz.	Cure and relief of tinnitus.
6	Mr. A—	Deafness and pain in left ear for 14 days; no cause known	The mucous membrane of tympanum shines through drum. Redness of Shrapnell's membrane. Eustachian obstruction and tinnitus. Later fluid exudation in tympanum. Watch: 1 in. Whisper: 6 in.	Acute salpingitis. Exudation in mouth of the tube. Fossa congested and swollen, but no bands or adenoids	Tube painted with increasing strengths of argyrol up to 40 per cent. Duration of treatment 6 weeks	Cured. Watch now heard at $3\frac{1}{2}$ feet and whisper at 8 feet.
7	Mr. F—	Tonsillitis followed by pain in ear. Duration of "earache" 3 weeks	Acute otitis. Later, fluid in ear	Acute salpingitis. Tube swollen, inflamed; mucous discharge. Eustachian obstruction	Tube painted with argyrol 30 per cent. Rest in bed, fomentations	Became chronic and later developed acute mastoiditis.

No.	Name.	History.	Ear.	Eustachian tube and fossa.	Treatment.	Result.
8	Dr. T —	Old case of chronic dry catarrh. At frequent intervals has attacks of pain in the ear and throat, worse at night. Hearing permanently worse after attacks	Drum indrawn, reddened, slight amount of serous exudation in tympanum. Tinnitus.	Acute salpingitis. Tube much congested and swollen. Granular condition of the lateral fossa. Eustachian obstruction	Fossa curetted, and painted with zinc chlor. 30 gr. to 1 oz. Tube painted with argyrol 30 per cent. every second day	Cured. Attacks usually last 3-4 weeks; with present attack patient was well in 1 week. Has had no attack for 3½ months (February, 1914).
9	Miss M —	"Cold in the head" 7 days ago. No previous ear trouble	Acute otitis. Small perforation Tinnitus	Acute salpingitis. Adenoids in fossa. Eustachian obstruction	Adenoids curetted. Argyrol 30 per cent. Tube painted every second day for a fortnight	Cured. Healing of perforation.
10	Mrs. H —	Sore throat 1 month ago. Pain in ear for 2 days. Perforation. Discharge. No pain now	Small perforation in postero-superior quadrant of membrane. Profuse watery discharge	Acute salpingitis. Discharge in mouth of tube	Tube painted every second day with argyrol 40 per cent. and a small quantity injected through catheter into middle ear	Cure. Perforation healed. Hearing improved.
11	Mr. P —	Three weeks ago had a "sore throat," followed by pain in the ear and throat. Suppuration in this ear, right, in childhood. Radical mastoid operation (left ear) in 1903	Old perforation behind malleus. Profuse discharge of thin watery fluid. Acute otitis. No pain now. Tinnitus	Acute salpingitis. Profuse mucopurulent discharge from ear. Hypertrophy of the mucous membrane of the post-pharyngeal wall	Tube painted with argyrol 30 per cent. Argyrol also injected through catheter into middle ear. Local treatment for ear.	Treated for 6 weeks without improvement. Became chronic. Operation later
12	Miss T —	Pain in left ear for 2 days, then free discharge. Has had trouble (discharge) with this ear before	Acute exacerbation of chronic middle-ear catarrh (suppurative). Perforation in Shrapnell's membrane. Free discharge	Acute salpingitis. Exudation in mouth of tube	Tube painted with argyrol 40 per cent., and a small quantity injected into tympanum. Repeated twice a week	Perforation healed in a fortnight.
13	Miss B —	Pain and cracking in left ear. Followed "cold" 3 weeks ago	Drum indrawn, no sign of inflammation. Inflation sound, indicated gummy together of walls of tube	Acute salpingitis. Very intense. Some small petechial hemorrhages in mouth of tube	Tube painted at first with zinc, 30 gr. to 1 oz., later argyrol, 30 per cent., twice a week	Complete relief of pain and tinnitus

The inflammation may be limited to the tube itself (Cases 1, 2, 3, 13), or may involve the mucous membrane of the middle ear as well (Cases 4, 5). Later secretion may be thrown out (Cases 6, 7, 8), and ultimately the drum may perforate (Cases 9, 10, 11, 12). The symptoms are fully given in the table and explain themselves. With regard to results, 13 cases were treated; 9 were cured, although 2 resulted in impaired hearing (Cases 1 and 10). Two cases were complete failures. My results are very similar to those of Holmes (7), who treated 11 cases with 2 failures. (See pp. 120, 121.)

CHRONIC SALPINGITIS.

Cases of chronic salpingitis are very frequent. I consider that a chronic primary inflammation of the Eustachian tube is one of the principal ætiological factors in the production of dry middle-ear catarrh, and as such its importance cannot be exaggerated.

Cases of chronic salpingitis may be divided into two main groups: (1) Primary, and (2) secondary.

(1) Primary: A chronic catarrhal inflammation of the Eustachian tube arising by way of the naso-pharynx, spreading to and, later, affecting the middle ear. This group of cases can be further subdivided into (a) inflammation with excessive secretion, *i. e.* the early cases of chronic catarrhal salpingitis; (b) inflammation without secretion, *i. e.* a later stage of the form just mentioned and one usually preceding atrophic salpingitis; (c) chronic inflammation with bands or adhesions in Rosenmüller's fossa.

Treatment of Chronic Catarrhal Salpingitis.

The mouth and tube were painted every second day with a solution of one or other of the following preparations. Zinc chloride 30 gr. to oz., silver nitrate solution 1-16, argyrol 15-40 per cent., the choice depending on the amount of inflammation and the effect of the previous application. Applications were made every second day by means of the naso-pharyngoscope and Eustachian applicator. Small quantities of the various solutions were in many cases forced up the tube to the tympanum, but in no instance was a reactionary inflammation of the middle ear produced. The results of treatment in 24 cases are now given:

(A) Hearing improved by amounts varying from 15 to 100 per cent. and tinnitus cured, 10 cases. In 3 cases fibrous bands in fossa removed with the curette.

(B) Hearing improved, tinnitus unaltered, 2 cases.

(C) Tinnitus improved, hearing unaltered, 2 cases.

(D) No alteration in either, 6 cases; 1 case bands in fossa removed.

(E) Cases still under treatment, 4. One case bands in fossa removed.

Chronic Salpingitis with Bands or Adhesions in Rosenmüller's Fossa.

These cases I consider are of sufficient importance to justify separate consideration. According to Roget (8) adhesion of the Eustachian tube with the posterior pharyngeal wall is a frequent cause of adhesive changes in the tympanic cavity. From my recent observations I doubt very much if this is so. A more likely supposition is that in those cases in which bands are found in the fossa and an adhesive process in tympanum, the causes responsible for one are also responsible for the other. The two conditions usually go together, and it is unusual to find one without the other (9).

Although possessing no absolute proof at present, I believe that in all cases of chronic salpingitis and middle-ear catarrh with adhesions a chronic microbial infection is present of a similar nature to that responsible for chronic rheumatism. The two diseases have many points of resemblance, some of which I just mention.

(i) Those countries in which chronic rheumatism is most prevalent are also those in which chronic middle-ear catarrh is, viz. Holland, Germany, Norway, Switzerland, and locally in some parts of Great Britain (10).

(ii) Both conditions are more common in women than men.

(iii) Acute rheumatism predisposes to chronic as does acute middle-ear catarrh to chronic.

(iv) The course of the disease and its results are similar, *i.e.*—inflammation, pain, effusion, adhesions and disability.

(v) Chronic rheumatism has been demonstrated to be due to infection arising from the throat (11), and rheumatoid arthritis from the teeth (12). Why not middle-ear catarrh from the naso-pharynx?

(vi) Both conditions are peculiarly liable to be affected by the weather; sufferers with middle-ear catarrh are more deaf in the damp weather, and rheumaticky people stiffer.

Further consideration will, no doubt, recall many other points of great similarity.

Adhesions in Rosenmüller's fossa and bands in the naso-pharynx

are by no means uncommon. In the fossa these bands may be single or multiple, firm or mere delicate threads, or the whole fossa may be obliterated by a fibrous web. In the naso-pharynx fibrous bands may extend from the lateral walls to the Eustachian cushions, or from the cushion to the posterior extremity of the inferior turbinate, or from one Eustachian eminence to the other (13) or right across the pharynx from one lateral wall to the other. The posterior edge of the septum may also be continued outwards into the post-nasal space by a sickle-shaped fibrous expansion dividing at its lower extremity, one limb passing to each Eustachian eminence. In the mouth of the tube bands or webs are rare; I have only seen one case. Probably the large naso-pharyngeal bands, and in some instances the symmetrical bands found in Rosenmüller's fossa, are developmental, but in the majority of cases the bands found in the fossa are post-inflammatory adhesions. Syphilitic scars, scars from operations (removal of adenoids) and traumatism excluded.

Treatment.—In all cases it is advisable to clear out the fossa, as firm bands in this region must have an influence in causing Eustachian insufficiency. In five cases this has been done. It is difficult to estimate the value of this proceeding alone, as in all cases treatment directed to the catarrhal condition of the tube has also been instituted. The results, therefore, are included in those of the treatment of chronic salpingitis.

(2) Secondly: A catarrhal inflammation of the Eustachian tube arising from or kept up by the passage of septic irritating matter passing from the middle ear to the naso-pharynx.

Chronic suppurative otitis media is a frequent cause of chronic salpingitis which in turn may become suppurative. The chronic inflammatory condition of the tube aggravates or maintains the suppuration in the middle ear, which in its turn increases the tubal inflammation and a vicious circle is established. Suppuration continuing about the tympanic orifice of the tube after a mastoid operation is frequently observed. If in these cases a naso-pharyngoscopic examination is made the mouth of the tube will be found to be swollen, containing pus or muco-pus. The floor of the tube is usually red and granular, like raw beef, and in extreme cases may even be ulcerated or covered with granulations. Direct treatment of the mouth and lumen of the tube is generally most satisfactory, and I have found in these cases that if the vicious circle is broken by the application of a weak solution of silver nitrate 1 in 16, or argyrol 30 per cent. and the injection of a small quantity within the lumen of the tube, the suppuration rapidly ceases.

No.	Name.	History.	Ear condition.	Naso-pharyngoscopic examination.	Treatment.	Result.
1	A. B.—	Mastoid operation 18 months ago	Ear still discharging. Granulations in lower part of mastoid cavity	Large granulation found in mouth of tube	Granulation in mouth of tube removed by aid of nasopharyngoscope and Eustachian forceps. Tube painted with zinc chlor. and injected. 6 applications and injections only	Cure. Cessation of discharge.
2	Mr. M.—	Radical mastoid operation in 1910	Free discharge from tympanic portion of mastoid cavity	Pus in mouth of tube. Chronic salpingitis	Tube painted and injected with argyrol 30 per cent. twice a week. Under treatment 2 weeks	Still discharging. Under treatment.
3	Miss F.—	Mastoid operation in 1906 for chronic suppuration of 8 years' duration	Kidney-shaped perforation around malleus. Mucoid discharge	Chronic salpingitis	Tube washed out and painted with argyrol 40 per cent. 3 times a week for six weeks	Cured. Discharge rapidly lessened and perforation closed.
4	Miss McT.—	Mastoid operation in May, 1913	Perforation small below umbo. Profuse mucopurulent discharge	Chronic salpingitis	Tube painted with argyrol and middle ear irrigated <i>per tubum</i>	Cured. Rapid lessening of discharge and healing of perforation by August, 1913.
5	Mr. B.—	Radical mastoid operation in November, 1912, for cholesteatoma	Discharge free. Accumulations of inspissated pus removed weekly	Pus in mouth of tube. Chronic salpingitis	Tube painted, and middle ear irrigated with argyrol, silver nitrate, zinc chlor. twice a week for 4 months	Ear dry, but perforation not healed.
6	Miss T.—	Pain in left ear for 2 days, then discharge. Discharge intermittent all her life	Medium-sized perforation behind malleus. This drum perforated for many years	Chronic salpingitis. Adenoids in Rosenmüller's fossa	Fossa curetted. Tube painted with argyrol 30 per cent. for 1 month	Cure. Discharge ceased and perforation closed

No.	Name.	History.	Ear condition.	Naso-pharyngoscopic examination.	Treatment.	Result.
7	Mr. W—	Chronic suppuration of the middle ear many years (both ears)	Right ear, large perforation behind malleus. Left ear, attic perforation. Discharge in both ears small in amount	Chronic salpingitis (both sides)	Both tubes painted regularly and tympanum injected with argyrol 30 per cent.	Cure. Right ear quite dry in 3 months; and perforation healed. Left ear, no discharge, but still a perforation.
8	Mr. M—	Radical mastoid operation in 1906 for chronic suppuration after scarlet fever	Tympano-mastoid cavity contains inspissated pus	Chronic salpingitis. Pus in mouth of tube. Adenoids in fossa	Adenoids removed. Painted tube and injected tympanum with argyrol 30 per cent.	Mastoid cavity not quite dry yet. Discharge now only mucoid. Under treatment.
9	Mr. F—	Radical mastoid operation December, 1912, for chronic suppuration of 10 years duration	Drums and pus in tympano-mastoid cavity	Adenoid remains in fossa. Chronic granular salpingitis	Fossa curetted. Tube painted and cavity injected with argyrol 30 per cent.	Under treatment.
10	Mrs. H—	Right ear, acute middle-ear suppuration, then mastoiditis. Operation, April, 1912	Perforation in drum high up behind malleus. Intermittent discharge. Drum red	Chronic salpingitis. Adenoid remains in fossa	Adenoids curetted. Tube painted and tympanum injected with argyrol 30 per cent. for 2 months.	Cured. Ear dry and perforation closed.

The danger of re-infection of the mastoid cavity from the naso-pharynx has led many otologists to devise methods to ensure the sealing up of the Eustachian tube, and one of the newest is that devised by Yankauer (15), who claims to be able to cure 60 per cent. of cases of chronic middle-ear suppuration by closure of the Eustachian tube without mastoid operation. It is obvious that so long as the Eustachian tube is patent, there is an ever-present danger of naso-pharyngeal infection spreading to the ear or mastoid cavity, but whether or no closure of the tube alone is sufficient to arrest a suppurative middle-ear process I am unable to judge, not having tried Yankauer's method.

The result of treatment in ten cases is appended in tabular form giving full details. It will be seen that arrest of suppuration was brought about in 7 of the 10 cases. The other 3 cases are still under treatment and are steadily improving. (See pp. 125, 126.)

TREATMENT OF AFFECTIONS OF NEIGHBOURING PARTS.

By neighbouring parts are included those areas or structures bordering on or in some way related to the pharyngeal ostium of the Eustachian tube, and included in this section are the following conditions :

(1) Enlarged posterior ends inferior turbinals. Hypertrophic salpingitis. Polypoid degeneration of inferior turbinals. Post-nasal polypi.

(2) Adenoid remains in Rosenmüller's fossa ; bands ; adenoid granules ; degenerated adenoid masses (granular).

(3) Accessory sinus conditions.

(4) Varicose veins about the mouth of tube.

(1) *Turbinal Conditions.*

I am quite of the opinion of Holmes that hypertrophy of the posterior end of the turbinate plays a much more important part in causing Eustachian insufficiency and its resulting otitis than deposits in the anterior part of the nose. The frequent association of tinnitus and an enlarged or polypoid posterior end pressing upon the anterior lip of the Eustachian tube is too common an occurrence to pass without notice. In some of these cases there seems to be a process of general hypertrophy of the mucous membrane of the post-nasal space, for besides hypertrophy of the inferior turbinal, (usually bilateral), there may be, and often is, hypertrophy of the cushion of the tube ; of the mucous membrane of the roof and posterior pharyngeal wall, and also of the posterior edge of the

nasal septum. There may be hypertrophy of the cushion of the tube without other structures being involved, as there may also be inferior turbinal hypertrophy without involving the cushion and other structures, and with no aural symptoms whatsoever.

In these cases of general hypertrophy the Eustachian tube is always narrowed, the middle ear catarrhal in the early stages, and in the later sclerosed with partial fixation of the drum and ossicles from an extension of the process of hypertrophy to the tympanic cavity. Politzer (14) has observed that fatty degeneration of the muscular apparatus of the pharyngeal portions of the tube takes place in cases of old-standing naso-pharyngeal catarrh,¹ and I think it is more than possible that a similar fatty degeneration of the intra-tympanic muscles may take place in the hypertrophic condition of which I am writing.

Hypertrophic Salpingitis.

Case.

Mrs. A. B.—, the wife of a doctor, had been deaf for years from chronic middle-ear catarrh. Drum catarrhal, indrawn and partially fixed. Constant low-pitched tinnitus. Three years ago a submucous resection operation done for a badly deviated septum. So far as the correction of the septal deformity was concerned, the operation was apparently quite successful, but she still continued to complain of nasal obstruction and stuffiness. Inferior turbinals cauterised on several occasions without marked benefit. In February of this year (1913), I examined her with the naso-pharyngoscope and had great difficulty in obtaining a satisfactory view of the mouth of the tube, owing to the swelling of the posterior lips of the tubes. The presence of this swelling was confirmed on using Hay's pharyngoscope, when it was observed that the swelling of the cushion was sufficiently great to encroach upon the posterior choane, and to partially block them. There was also a chronic salpingitis. The cushion was much congested and scarlet in colour.

Hearing, February, 1913:

	Right.	Left.
Small watch	Contact .	Contact.
Large watch	18 in. .	20 in.
Meatus fork C ¹	— 30 secs. .	— 18 secs.
Weber	Equal.	
Rinne	Negative (both).	

The cushions were painted regularly with argyrol for some considerable time, the method adopted being that with the Yankauer speculum.

An astringent post-nasal paint was also prescribed for daily use by the patient.

My notes on succeeding dates are as follows:

March 17.—“Posterior lips still large, red and inflamed.”

March 31.—“Swelling less. Posterior lip now only size of an ordinary hypertrophy.”

April 14.—“Swelling of cushion is less, now only a little more than normal. Nasal catarrh and breathing better. Hearing greatly improved.”

¹ In this condition hypertrophy of the mucous membrane is the rule.

May 1.—“Cushion normal. Hearing still improving. Drums are now devoid of catarrh.”

August 22.—“After another course of regular painting of cushion and Eustachian tube, tinnitus quite disappeared.”

Hearing:

	Right.	Left.
Small watch	6 in.	8 in.
Large watch	2 ft.	2½ ft.
Meatus tuning-fork C ¹	—10 secs.	—5 secs.
Rinne	Negative.	
Weber	Equal.	

A somewhat similar case to this has been recorded by E. F. Potter (16), in which the patient complained of a feeling of stuffiness in the nose. On examining the naso-pharynx two large red swellings were seen projecting from the sides of the cavity, obstructing to a considerable extent the view of the choana. The following diagnosis was made: “Abnormally large cartilaginous extremities of the Eustachian tube; anatomical abnormality.”

Enlarged Posterior Ends.

Cases.

Mr. W——, aged eighteen. Stuffiness in the nose and ears. Occasional tinnitus. Intermittent Eustachian obstruction. Much enlarged “mulberry” posterior ends (bilateral), encroaching and pushing on one side the anterior lip of the tube. Posterior end removed by snaring through the nose. Mouth of tube painted several times with zinc chloride, 30 gr. to oz. Result: relief of symptoms.

Nurse W——, aged thirty-five. Chronic middle-ear catarrh. Tinnitus. Right ear worst. Intermittent Eustachian obstruction right ear. Slightly deaf both ears. Enlarged posterior end on the right side pressing on the anterior lip of the tube. Posterior end was removed by snare through nose and completely relieved the tinnitus. No effect on deafness.

Post-nasal Polypus.

Case.

Captain W——. Deaf in left ear; duration ten years. Nose blocked; deviated septum to left; accident eighteen years ago. Left membrana tympani indrawn and partially fixed. Naso-pharyngoscope. Large post-nasal polypus extending from choana over anterior surface of the mouth of tube and anterior lip into the mouth proper, which it fills. Polyp arises from inferior turbinate. Tubal area much congested. Varicose veins on anterior lip extending into choana. Under a general anæsthetic deviation of septum corrected by a submucous resection and post-nasal polypus snared. Tube painted (Holmes’ method) after operation with argyrol 20 per cent. daily for a fortnight.

	February 13 when first seen .	August, 1913 six months after operation).
Small watch	9 in.	18 in.
Large watch	2½ ft.	6 ft.
Meatus tuning-fork C ¹	—40 secs.	—10 secs.
Weber	Referred to left ear.	
Rinne	Negative.	

(2) *Adenoid Remains.*

The varied appearances presented are referred to in the writer's previous article in this Journal. The treatment in all cases is the same: removal of all degenerated and diseased tissues.

When limited to the fossa of Rosenmüller, this can easily and expeditiously be carried out under cocaine anæsthesia and with Yankauer's speculum, using a maxillary antrum curette (smallest size) with a flexible stem which can be bent in a direction suitable for each case. The proceeding is painless and there is but little bleeding. Bridges of fibrous tissue can also be removed in a similar fashion. Following removal, I am in the habit of painting the fossa with a weak solution of arg. nit.

Adenoid remains on the roof and posterior wall of the naso-pharynx are ideal breeding-grounds for the particular group of micro-organisms associated with post-nasal catarrh, and no doubt when local conditions are favourable to their growth they are, by extension, the exciting cause of acute salpingitis and otitis (see "Acute Salpingitis"). The occurrence of the so-called "throat organisms" in aural discharges is too well known to need further comment.

Operation.—The naso-pharynx should be sprayed with a 10 per cent. solution of cocaine ten minutes before operation. Then, under the direct guidance of the naso-pharyngoscope, the roof and posterior wall should be gently curetted, special attention being paid to all folds, recesses and necrotic areas. Bleeding may be fairly free, and it may be necessary to withdraw the naso-pharyngoscope from time to time as the prism becomes obscured. The post-nasal space in the interval may be advantageously sprayed with a weak astringent solution.

Results.—To estimate the value of treatment is well-nigh impossible, for the reason that rarely do these adenoid remains cause characteristic symptoms. They may be, and are, responsible for post-nasal discharges, acute and chronic salpingitis, suppurative and non-suppurative middle-ear catarrh, and tinnitus without deafness (Rosenmüller's fossa).

"Prevention is better than cure," and if by treatment one is enabled to prevent a patient becoming deaf from successive attacks of acute salpingitis and otitis, good is done impossible of statistical estimation. Three typical cases are briefly mentioned although 25 cases have been treated and are referred to in other sections.

Cases.

Miss C—, aged forty. Chronic middle-ear catarrh. Constant low-pitched tinnitus. Adenoid remains in fossa. Removed under cocaine anæsthesia with curette and Yankauer's speculum. Tinnitus greatly improved but not cured. Deafness unaltered.

Commander L—, aged thirty-eight. Slightly deaf in both ears. Duration five to six years. Constant low-pitched tinnitus. Left ear worst. Naso-pharyngoscope. Large masses of granular adenoids in each fossa. Left Eustachian tube deformed. Under N_2O adenoid masses curetted and left tube dilated. Both tubes painted every second day with argyrol 20 per cent. *Result*: Tinnitus cured; deafness much improved, i. e. small watch, increase of hearing distance from ten to twenty-five inches.

Remarks: Neither with the finger nor the post-nasal mirror would these adenoid remains have been recognised.

Mr. H—, aged twenty-two. Chronic catarrh of the middle ear (bilateral). Tinnitus severe. Adenoid remains in each fossa. Under cocaine anæsthesia and with Yankauer's speculum, granular remains removed with curette. *Result*: Tinnitus cured. Deafness unaltered.

(3) Accessory Sinus Conditions.

While either the maxillary or frontal sinuses may drain into the post-nasal space, it is the sphenoidal with which we are particularly concerned, as it always drains into this area.

In a certain number of cases, by the aid of the naso-pharyngoscope, the orifice of the sphenoidal sinus may be seen and recognised without the removal of the middle turbinate bone, its recognition being greatly aided by the presence of pus exuding from the sinus. The nose is first prepared by shrinking the mucous membrane with a weak cocaine and adrenalin solution. The instrument is then passed along the floor of the nose until the tip reaches the posterior edge of the hard palate, the lens being turned directly upwards. The orifice of the sinus between the middle turbinal and septum will come into view in the lower part of the field of the naso-pharyngoscope. It may be necessary to rotate the instrument a little to right or left.

A sphenoidal sinus suppuration may be easily overlooked or called post-nasal catarrh if one relies wholly on the post-nasal mirror. Neither must the relationship of the sphenoidal sinus to the Eustachian tube be forgotten, as discharge from the sinus almost invariably flows over the middle turbinate bone into a Eustachian ostium.

In these cases the floor of the tube is red, swollen and œdematous, and may even suggest raw beef in appearance. I have seen one such case.

(4) *Varicose Veins.*

From further experience in the use of the naso-pharyngoscope I am inclined to think that in my previous paper the number of cases in which I stated that varicose veins were found was put at too high a figure (198). I have now examined close on 1500 cases, and my more recent observations lead me to think that in only about 15 per cent. of cases are true varicose veins found. They are then almost invariably associated with an enlarged posterior end or other abnormal conditions about the posterior choanæ. Veins larger than those normally found in this region are frequently encountered, but are variations within physiological limits.

There is a close connection between the veins of the tympanic cavity and those of the Eustachian tube. If these communicating plexuses become engorged with blood, they may have an influence in regulating the lumen of the tube.

The treatment in pronounced varicosity on general principles should be an attempt to obliterate the vessel. In only one case have I done this.

Case.

Mrs. McL.—, aged thirty-seven, complained of loud tinnitus in the right ear. No deafness. Ears normal. Naso-pharyngoscope, slight hypertrophy of right posterior end with a large, tortuous varicose vein radiating from it and spreading out in a fine plexus about the mouth of the tube. The nasal cavity was well anæsthetised with cocaine and with the aid of a long galvano-cautery point, encased in a piece of rubber tubing, and under the direct control of the naso-pharyngoscope the vessel was obliterated for a considerable distance. By the following day all tinnitus had quite disappeared and the fine plexus of veins about the mouth had also gone. It is now four months since this was done and there has been no return of the tinnitus.

REFERENCES.

- (1) E. M. HOLMES.—“Examination and Treatment of the Eustachian Tubes by the Aid of the Naso-pharyngoscope,” *Annals of Otology*, September, 1911.
- (2) BRAISLIN.—“Relief to Tinnitus by the Use of Silver Nitrate applied within the Eustachian Tube,” *ibid.*, September, 1912.
- (3) E. P. EMERSON.—“Rosenmüller’s Fosse and their Importance in Relation to the Middle Ear,” *ibid.*, September, 1907.
- (4) E. M. HOLMES.—“The Eustachian Tube in Chronic Otitis Media,” *ibid.*, September, 1912.
- (5) YANKAUER.—“Report of the Proceedings of the American Laryngological, Rhinological, and Otological Society,” *Journ. of Laryngol., Rhinol., and Otol.*, July, 1912, p. 397.
- (6) B. A. RANDALL.—“Dionin in the Relief of Chronic Catarrhal Deafness,” *Proc. Ninth Internat. Otol. Congress*, 1912, and *Archives of Otology*, xxxvi, p. 1, 1907.
- (7) HOLMES.—*Annals of Otology*, September, 1911.
- (8) POLITZER.—“Diseases of the Ear,” p. 328.

- (9) J. WALKER WOOD.—“Direct Examination of the Eustachian Tube and Naso-pharynx,” *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, November, 1913.
- (10) “Clifford Allbutt’s System of Medicine,” 1902, vol. i, p. 28.
- (11) MACKENZIE.—*Brit. Med. Journ.*, 1912, p. 1232.
- (12) GOADBY.—*Practitioner*, 1912, p. 107.
- (13) SCHLEMMER.—*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, June, 1913, p. 332.
- (14) POLITZER.—“Diseases of Ear,” p. 327.
- (15) YANKAUER’s articles in the *Laryngoscope*, 1910 and 1913; also *Proc. Ninth Internat. Otol. Congress, Boston*, 1912.
- (16) E. F. POTTER.—“Abnormally Large Eustachian Eminences,” *Trans. Otol. Soc.*, vol. vii, 1906, p. 39.
- (17) A. VON GYERGTYAL.—*Deutsch. Medizin. Wochenschrift*, No. 25, 1913.

REPORTS FOR THE YEAR 1913 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART II.

STATISTICAL TABLES.

By JOHN HEWAT, M.D., CH.B.
Non-Resident House-Surgeon.

AFFECTIONS OF THE NOSE.

(1777)

I. *The External Nose.*

Deformities	4
Collapse of alæ nasi	1
Fracture of nasal bones	4
Cyst of nose	1
Dermatitis of nasal vestibule	21
Lupus	2
	<hr/>
	33

II. *The Nasal Cavities.*

Deflection of septum to right	249
Deflection of septum to left	262
Irregular deflections	77
Bleeding polypus of nasal septum	1
Hæmatoma of septum	2
Abscess of septum	3
Perforation of septum	8
Acute, subacute and chronic rhinitis	380
Inferior turbinal enlargement	450
Polypoid middle turbinals and nasal polypi	100
Atrophic rhinitis (non-fœtid)	40
Atrophic rhinitis (fœtid)	24
Purulent rhinitis	26
Epistaxis	35
Lupus of mucous membrane	9
Tubercular ulceration	1
Syphilitic disease of nose	7
Malignant tumours	3
Foreign bodies	6

Nasal neurosis (including asthma)	39
Membranous rhinitis	1
Rhinitis sicca	14
Rhinitis caseosa	2
Synechiæ between septum and turbinal	4
Unknown nasal disease	1

1744

ACCESSORY NASAL SINUSES.

(88)

Acute antral inflammation	6
Chronic antral suppuration	38
Acute frontal sinus inflammation	5
Chronic frontal sinus suppuration	6
Chronic ethmoidal sinus suppuration	2
Chronic sphenoidal sinus suppuration	1
Chronic fronto-maxillary suppuration	4
Chronic frontal, ethmoidal, and antral suppuration	2
Chronic fronto-ethmoidal suppuration	1
Chronic frontal, ethmoidal and sphenoidal suppuration	1
Chronic ethmoidal and antral suppuration	3
Pansinusitis	3
Dental cyst invading antrum	3
Naso-antral polypi	8
Frontal mucocele	1
Malignant disease of antrum	2
Squamous epithelioma of right frontal sinus	1
Sarcoma of left ethmoid	1

88

DISEASES OF THE NASO-PHARYNX, PHARYNX, FAUCES AND MOUTH.

(1412)

Adenoids and enlarged tonsils	1082
Acute tonsillitis	38
Vincent's angina	6
Peritonsillar abscess	12
Diphtheria	2
Catarrhal pharyngitis (acute)	12
Retro-pharyngeal abscess	2
Lateral pharyngeal abscess	1
Chronic catarrhal pharyngitis and granular pharyngitis	110
Pharyngitis sicca	20
Keratosis pharyngis	3
Elongated and bifid uvula	5
Syphilis (secondary)	15
Syphilis (tertiary)	10
Lupus	5
Tuberculosis	1
Hypertrophy of lingual tonsil	5
Enlarged Eustachian cushions	2
Multiple telangiectasis	1
Papilloma of uvula	1
Cyst and calculus of tonsil	1
Malignant disease of naso-pharynx	5
Malignant disease of palate	4
Malignant disease of tonsil	2
Malignant disease of tongue	1
Malignant disease of oro-pharynx	4
Foreign bodies	8
Paralysis of soft palate	5
Sensory neurosis	30
Cleft palate	3

Acute glossitis	2
Alveolar abscess	4
Sycosis of lip	1
Tertiary syphilis of palate	9
	<hr/>
	1412

AFFECTIONS OF THE LARYNX AND TRACHEA. (154)

I. *Acute.*

Acute catarrhal laryngitis	18
Acute œdematous laryngitis	2
	<hr/>
	20

II. *Chronic.*

Chronic catarrhal laryngitis	17
Perichondritis	2
Laryngitis sicca	5
Vocal nodules	4
Lupus	4
Tubercular disease	31
Syphilis	4
	<hr/>
	67

Simple: III. *Tumours.*

Papilloma	3
Myxoma	1
Malignant:	
Intrinsic carcinoma	4
Extrinsic carcinoma	2
	<hr/>
	10

IV. *Afections of the Nerves.*

Functional aphonia	20
Abductor paralysis (left)	3
Abductor paralysis (bilateral)	3
Complete recurrent paralysis (right)	3
Complete recurrent paralysis (left)	7
Sensory laryngeal neurosis	6
	<hr/>
	42

V. *Miscellaneous.*

Foreign bodies in larynx	2
Foreign bodies in bronchus	1
Cyst of epiglottis	1
Thyro-glossal cyst	1
Goitre	10
	<hr/>
	15

AFFECTIONS OF THE ŒSOPHAGUS. (31)

Stricture:	
Simple	3
Malignant	5
Post-cricoid carcinoma	9
Foreign bodies	8
Neurosis	6
	<hr/>
	31

AFFECTIONS OF THE EAR. (1943)

I. *The External Ear.*

Congenital malformations	2
Erysipelas	2

Perichondritis	3
Cerumen	220
Furunculosis	41
Otitis externa diffusa	44
Stricture of meatus	2
Exostosis of meatus	5
Cyst of meatus	2
Foreign bodies	8
Aural neurosis	20
Malignant disease	1
Abscess	1
	<hr/>
	351

II. The Middle-ear Cleft.

Eustachian obstruction :	
Right	30
Left	50
Bilateral	300
Acute non-suppurative otitis media :	
Right	15
Left	20
Bilateral	23
Chronic non-suppurative otitis media :	
Right	26
Left	20
Bilateral	120
Acute suppurative otitis media :	
Right	40
Left	35
Bilateral	15
Chronic suppurative otitis media :	
Right	120
Left	120
Bilateral	110
Sequelæ of chronic suppurative otitis media :	
Right	70
Left	62
Bilateral	105
Acute suppurative otitis media with mastoid complications :	
Right	12
Left	18
Chronic suppurative otitis media with mastoid complications :	
Right	23
Left	26
Tubercular otitis media	7
Otosclerosis	27
Mixed middle- and inner-ear deafness	75
Intra-cranial complications of suppurative otitis media :	
In seven acute otitis media suppurativa.	
• In nine chronic otitis media suppurativa.	
Extra-dural abscess	4
Peri-sinus abscess	1
Thrombosis of jugular bulb and vein	2
Sigmoid sinus thrombosis	2
Serous meningitis	1
Purulent meningitis	5
Cerebral abscess (temporo-sphenoidal), left	2
Cerebellar abscess	1
	<hr/>
	1486

III. The Internal Ear.

Internal ear affections :	
Congenital (including deaf-mutism)	18

Traumatic	5
Occupational	4
Congenital syphilis	17
Acquired syphilis	1
Cerebello-pontine tumour	1
Tumour at base of brain	1
Serous labyrinthitis	6
Suppurative labyrinthitis	4
Functional	2
Senile changes	7
Unknown causes	40

106

MISCELLANEOUS CASES.

(These include cases sent from other wards in the hospital with negative findings, enlarged cervical glands, skin diseases, headaches of obscure origin, mental defects, eye cases, carious teeth, etc.)

TABLE OF OPERATIONS.

The Nose.

Setting nasal fractures	2
Abscess of septum	1
Hæmatoma of septum	1
Submucous resection of septum	131
Foreign body	1
Curetting for lupus	2
Turbineotomy	115
Nasal polypi	133
Paraffin injection	3

389

The Accessory Sinuses.

Antrum:

Proof puncture of antrum	85
Intra-nasal opening of antrum	4
Radical operation on antrum, including naso-antral polypi	29
Radical operation on frontal sinus	8
Ethmoidal curetting	2
Sphenoidal sinus	2
Dental cyst	2
Alveolar abscess	1

133

The Pharynx.

Adenoids and tonsils	580
Enucleation of tonsils and removal of adenoids	490
Peritonsillar abscess	10
Retro-pharyngeal abscess	2

1082

The Larynx, Trachea, and Œsophagus.

Tracheotomy	3
Removal of laryngeal papilloma	3
Removal of vocal nodules	2
Bronchoscopy	3
Œsophagoscopy	39
Suspension laryngoscopy	17
Foreign body removed from bronchus	1
Foreign body removed from larynx	1
Foreign body removed from Œsophagus	8
Post-cricoid carcinoma exposed and radium inserted	1
Radium applied to malignant growths	2

80

The Ear.

Furunculosis	13
Paracentesis	31
Aural polypi	23
Abscess over mastoid	3
Plastic closure after Schwartz operation	17
Acute mastoiditis (Schwartz)	30
Modified radical mastoid	1
Radical mastoid	65
Operations on labyrinth	4
Opening sigmoid sinus	4
Ligature of internal jugular vein	2
Incision of dura for meningitis	1
Opening extra-dural abscess	3
Opening peri-sinus abscess	1
Exploration of temporo-sphenoidal lobe	3
Exploration of cerebellum	3
Translabyrinthine drainage in meningitis	1
	<hr/>
	205
Intra-venous injection of salvarsan	2
Intra-venous injection of neo-salvarsan	4
	<hr/>
	6

Anæsthetics.

Local anæsthesia	590
Ethyl chloride	1084
Chloroform followed by ether	215
	<hr/>
	1889

New patients during 1913 = 3200.

ABSCESS OF THE NASAL SEPTUM SECONDARY TO FURUNCLE OF THE VESTIBULE.

BY DAN MCKENZIE.

THE patient was a young man, aged twenty-five, a mining engineer in West Africa. He had been home on leave for about three months when I first saw him.

Shortly after leaving West Africa in March, 1913, he became afflicted with boils, one appearing behind the ear and another on the neck. On May 1 he felt some irritation inside the nose on the right side, and two days later the outside of the nose started to swell. There was considerable pain, preventing him from sleeping, and ultimately compelling him to stay in bed. A doctor, who was called in, incised the swelling inside the vestibule, evacuating a quantity of pus which continued to discharge for about a week or ten days. Some yellow "cores" were observed to come away.

Six weeks later, when I first saw him, the discharge from the vestibule had almost ceased, but he was complaining of inability to breathe through the nose, and on examination this was seen to be

due to a large soft swelling on both sides of the septum, low down and continuous with the swelling in the vestibule. A few days later the vestibular swelling had subsided but there was no change in the septum, so an incision was made into it on the right side and a large quantity of pus was delivered. On putting the little finger into the abscess-cavity in the septum, a fenestra was discovered in the cartilage large enough to let the finger pass through it to the other side.

Recovery ensued rapidly, but with some broadening and depression of the cartilaginous segment of the nasal bridge.

There was no history of accident. The most probable explanation of this curious case is that the pus of a vestibular furuncle which had developed around one or more of the hair-follicles in this region had burrowed back in the adherent vestibular subcutaneous and submucous tissue until it reached the smooth subperichondrial space, and that accumulating here, and being prevented from reaching the ethmoidal and vomerine region by the periosteum which encloses the bone edge and shuts it off from the cartilage, it had finally liquefied the cartilage, already damaged by the stripping up of its muco-perichondrium, and so had gained access to the other side of the septum.

It is possible, of course, that there may have been a fenestra in the cartilage prior to this abscess, of the type which has been described and shown by the writer (1), and also by Jefferson Faulder (2), at the Laryngological Section of the Royal Society of Medicine, but that a unilateral septal abscess may find its way to the other side by destroying a portion of the cartilage is undeniable.

The behaviour of septal abscesses as regards burrowing is sometimes peculiar. I can recall a case of traumatic hæmatoma abscess, also shown at the Laryngological Section of the Royal Society of Medicine (3), in which the pus found its way downwards in front of the superior maxilla, protected like the vomer by its periosteum, and opened in the mouth in the gingivo-labial recess of the upper lip to one side of the frænum. It was possible to pass a probe through the fistulous opening in the mouth directly up into the abscess-cavity in the septum.

So far as I have been able to discover there does not seem to be any case described in the literature equivalent to either of these two cases. But as regards the tracking of pus between the nose and the mouth, although the above sequence seems to be unprecedented, on the other hand a number of cases have been recorded in which pus from a carious incisor tooth has burrowed

its way upwards into the nose and has led to the formation of a subperichondrial septal abscess (4). In some instances the explanation given is that the pus probably reached the septum by way of the anterior palatine foramen, but one or two observers suggest as an alternative route that followed from above by the pus in my case, namely, along the outer aspect of the bone of the maxilla.

Septal abscess is known to follow typhoid fever, smallpox, erysipelas and influenza, but, as I have already said, I have not been able to find any record of its association with furunculosis of the vestibule.

REFERENCES.

- (1) MCKENZIE, DAN.—JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, vol. xxv, p. 632.
- (2) FAULDER, JEFFERSON.—*Ibid.*, vol. xxviii, p. 545.
- (3) MCKENZIE, DAN.—*Ibid.*, vol. xxiii, p. 258.
- (4) TRAUTMANN, G.—Fränkel's *Archiv f. Laryngol.*, Bd. xxxii, Heft 3, 1910, p. 360.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

January 16, 1914.

MR. RICHARD LAKE, *President, in the Chair.*

Mastoiditis without any Apparent Middle-ear Suppuration.—**Dan McKenzie.**—A girl, aged six. Tonsils and adenoids were removed on November 27, 1912. For several days after the operation pain was felt at times when the ear was touched, but no genuine earache was experienced. On January 1, 1913, the mastoid region began to show swelling, and on January 2 she returned to hospital, where the cortical mastoid operation was at once performed. As far as could be made out the membrane seemed to have a perfectly normal appearance, and at no time was there any discharge from the meatus. The mastoid cells were occupied by pus and granulations. Recovery was uneventful.

In Mr. STUART-LOW's experience these cases were not uncommon. He had often operated upon children where a mastoiditis has supervened, and even a mastoid abscess, and there had never been any aural discharge nor evident middle-ear implication whatever. Such cases were usually influenzal, and gave a history of "throat first being affected." No doubt in all such instances a fugitive otitis media had been present, but the infection seemed to rapidly pass on and settle in the mastoid antrum, and subsequently set up a mastoiditis, periostitis, and mastoid abscess.

Mr. WHALE had under his care at the moment a child, aged five, in whom there was a large peri-sinus abscess in the skull, extending backwards 1 in. along the horizontal part of the sinus. An ounce of pus was

evacuated, and there was evidence that the middle ear was the focus of the trouble, for the membrane bulged at the time, and after the operation this bulging subsided; the child was now rapidly recovering, the membrane being normal.

Dr. Kelson said the case must be considered not proven. It was the old argument—*post hoc, propter hoc*; the woman said the operation was performed two months previously, and unless there was evidence of some pathological condition being set up and persisting during this interval, it was only supposition to say it was due to the operation.

Acute Purulent Otitis Media, with Signs of Acute Labyrinthitis; Recovery without Labyrinth Operation.—F. W. Bennett and Dan McKenzie.—The patient, a hospital nurse, aged twenty-nine, came under Dr. Bennett's care in December, 1912, with pain in the right ear and discharge of two or three weeks' duration following influenza. The cortical mastoid operation was performed a month later, but fever, vertigo, and deafness continued. Three weeks later the wound was reopened and a further exploration made, in the course of which the middle fossa, which was very low, was opened. No fistula into the labyrinth was detected, although labyrinth symptoms were marked. The temperature fell to normal after the second operation, and the wound slowly healed. The patient came under Dr. Dan McKenzie's care on October 17, 1913, complaining of severe and continuous pain behind the right ear radiating up to the top of the head and down into the neck. There was giddiness on slight movement of the head; nausea, but no vomiting. The patient tended to fall to the right. There was no spontaneous nystagmus. The post-aural wound was healed, and there was no discharge from the ear. The tests showed absence of hearing in the right ear (noise-machine) and the vestibular reactions were absent. The temperature was normal. On October 20 the radical mastoid operation was performed as an exploratory measure, but all the parts were sound, and there was no sign of pus anywhere. A lumbar puncture gave normal cerebro-spinal fluid. The pain continued after the operation, and on October 25 lumbar puncture was again performed, and normal cerebro-spinal fluid again obtained. On October 28 a neurological examination was made, with the diagnosis of functional disorder. A few days later under strong moral suasion the pain and other symptoms suddenly disappeared. Recovery. The right ear is still quite deaf, and the vestibular responses are negative.

Malignant Disease of External Ear, with Extensive Invasion of Temporal Bone; Operation; Recovery.—W. Milligan.—Female, aged fifty-four, first seen on June 20, 1913. The whole of the right auricle, with the exception of the lobule, ulcerated away. Enlarged glands about angle of jaw and in front of sterno-mastoid. History of eight months' progressive destruction of tissue. Symptoms: Severe pain in the region of the ear and lower jaw; marked loss of weight and weakness. Right membrana tympani perforated in lower anterior segment. Portion of growth removed; epithelioma. June 26, operation: Ligature of external carotid artery. Complete removal of ulcerated surfaces including lobule of the ear. Underlying bone (squamo-mastoid portions of temporal bone) found to be extensively involved by growth. On account of collapsed condition of patient further operative interference postponed. July 17: The whole of the mastoid process, including apex, removed. Lateral sinus freely exposed. Squamous portion of temporal bone removed immediately below sutural line, with consequent large

exposure of dura mater of middle fossa, which in one place was found to be involved. Granulation-tissue removed and pure carbolic acid applied. Enlarged glands removed. Progress since operation good. After second dressing, 5 per cent. solution of scarlet red in olive oil applied every second day. Epidermisation over granulating dura rapid. Perforation of membrana tympani healing. About the middle of August patient transferred to Skin Hospital for Finsen light treatment. January, 1914: Whole surface healed with the exception of $\frac{1}{2}$ in. just above and anterior to the external auditory meatus. No sign of any recurrence, local or otherwise. Perforation of membrana tympani healed.

Dr. URBAN PRITCHARD considered that it was as yet early days to judge concerning the result in this case.

Mr. G. J. JENKINS alluding to the use of scarlet red in a malignant case, said that suggestions had been advanced that it favoured the incidence of epithelioma. When used for ulcers of the leg, for example, it was said to have caused epithelioma.

Dr. MILLIGAN was aware of the allegations against scarlet red which Mr. Jenkins mentioned, but did not know of a case in which any harm had actually been proved. He had used it on very many occasions, and had seen nothing go wrong. A colleague said recently he thought it a very irritating preparation, but he (Dr. Milligan) had not found it so. In this present case there had been a very large granulating surface; practically the whole temporal bone had been removed except the petrous, and he thought scarlet red would help matters; the new epithelium seemed quite good.

Cerebellar Abscess; Operation; Recovery.—W. Milligan.—

Male, aged fifteen, first admitted April, 1909, with both ears discharging. Radical operation upon right ear; local treatment advised for left ear. Re-admitted November 10, 1913. Right ear perfectly well; antro-tympanic cavity completely epidermised.

For past three weeks he had complained of severe headache, mainly frontal. Had felt sick, but has not vomited until day before admission. Had been very constipated. Patient rational, but cerebation slow. Temperature, 98.2° F., pulse 66, respiration 18. No paralysis. Knee-jerks exaggerated, equal. No Babinski. Marked ataxia. Tendency to fall forward. Dysdiadokokinesis present. Pupils equal and dilated. Optic neuritis (?). Nystagmus on looking to left (affected side). Left auditory meatus full of dense polypoid tissue and pus—impossible, therefore, to make a complete labyrinth examination. Diagnosis: Left cerebellar abscess. Previous to operation 4 dr. of cerebro-spinal fluid withdrawn—clear and under pressure. Operation: Radical mastoid. Opening made through posterior wall of antrum; cerebellar dura exposed; incised. Abscess containing a little over $\frac{1}{2}$ oz. of pus evacuated. Drainage by means of rubber tube. Bacteriological examination: Almost a pure streptococcal infection; a few staphylococci present.

Mr. JENKINS asked whether Dr. Milligan had ever noticed that in doing a lumbar puncture there was, after the puncture, a more definite localising pain than before the puncture. He recently had a case in which the difference in that way was very marked; the patient, immediately after the lumbar puncture was done, placed a finger on the side of the head about the position of posterior part of the temporo-sphenoidal lobe which contained an abscess. Perhaps the experience is worth remembering as a possible aid to localisation.

Dr. MILLIGAN thought he would have been severely handled by

members for having done a lumbar puncture at all in the case; he had been criticised for having done so on previous occasions, but in his opinion it was a valuable proceeding under certain circumstances.

An Uncommon Form of Malignant Disease of the Ear.—

Sydney Scott.—The following example of malignant disease of the ear is uncommon, in that there was an ulcerating growth which resembled a rodent ulcer in appearance and structure, but contained large numbers of keratinised epithelial “cell-nests,” and was accompanied by metastases in the neighbouring lymphatic glands and in the sterno-mastoid muscle. Male, aged forty-six, an engineer’s fitter, was first seen in October, 1913, when he had an ulcerating growth which involved the left auricle. The growth blocked up the external auditory meatus, and the left side of the face was completely paralysed. History: The disease had begun as a swelling behind and below the ear five years previously. The swelling grew steadily larger, and then after twelve months “broke” and formed an ulcer which persisted, spreading steadily for four years. The face had been paralysed for four or five weeks. Local condition: The lower half of the left auricle was involved in an ulcerating swelling. The ulcerated area corresponded to the retro-auricular sulcus. The ulcer took the form of a deep fissure about 2 in. long. The edges were indurated and everted. There was a second ulcer in the floor of the meatus which was occluded by the growth. A considerable swelling was obvious in the parotid region and in the adjacent part of the sterno-mastoid muscle. The cervical lymphatic glands lower down were palpably enlarged and an isolated hard lump was found in the sterno-mastoid muscle. Treatment: The disease was removed in October, 1913, in two stages—the main mass with the parotid salivary gland at the first stage, and the cervical lymphatic glands with a second portion of the sterno-mastoid muscle at the second stage. An attack of erysipelas followed the second operation. As it had been impossible to cover the exposed tissues with integuments the process of healing was expedited by Thiersch skin-grafts.

Pathological Report on Sections of Growth in Region of Pinna.—

Section 1: Piece of edge of ulcer close to pinna. The section shows masses of deeply-staining, small spheroidal cells with a tendency towards a palisade arrangement at the margins resembling that seen in a rodent ulcer. These masses of cells are infiltrating adjacent tissues. Scattered throughout the section are large numbers of “cell-nests,” composed of keratinised squamous epithelium. These are singularly well formed and perfect. Section 2: Of a secondary deposit in the sterno-mastoid. The section shows a mass of striped muscle, in the substance of which there is a secondary deposit of growth similar to that shown in the first section. The cell-nests are not nearly so numerous. Section 3: Of a lymph-gland from the neck. The section shows the structure of a lymph-gland affected with tubercle. There is a considerable amount of endothelial proliferation and many multinucleated giant-cells. In one part of the gland there is a small deposit of growth similar to 1 and 2, but there are no cell-nests.

Dr. MILLIGAN did not feel certain concerning one little spot; it seemed as if a nodule was there. From the description—not having seen the microscopic sections—he would have thought it was a carcinoma. Was the gland in section 3 infected from the throat? On reading the notes over, it seemed that there might have been some infection from the throat. Also, did Mr. Scott think the attack of erysipelas was bene-

ficial in this case? Once or twice erysipelas had arisen in patients after aural operations, and had appeared to constitute an excellent whipper-up, causing rapid healing.

Mr. MOLLISON asked whether Mr. Scott proposed to use radium emanations with a view to preventing a recurrence.

Mr. JENKINS asked whether Mr. Scott regarded the secondary deposit as a rodent ulcer, or as epithelioma. He was aware of the difficulty of classifying these tumours, but cases were known in which a rodent ulcer had shown something like cell-nests. He also had intended to ask as to whether or not there was improvement associated with the occurrence of erysipelas in this cancerous condition.

Mr. SYDNEY SCOTT replied that he would not care to express any views in favour of erysipelas in the treatment of malignant disease, but recalled the introduction of Coley's fluid, which was manufactured from strains of streptococci obtained from erysipelatous patients. The secondary deposits had the histological appearances of rodent ulcer. He was in favour of the view that the recurrences would behave as rodent ulcer.

[*Addendum.*—January 30, 1914: Mr. Scott had removed the ulcerated spot referred to by Dr. Milligan and it presented the same histological characters as the original growth. The patient was still under observation.]

Patient after Operation for Aural Vertigo.—Richard Lake.

Male, aged sixty-one, had been totally deaf on the left side for at least three years, and had suffered with constant attacks of giddiness and sickness for about seven years. He had led an extremely active life. The first attack of vertigo came on seven years ago quite suddenly while he was in bed and asleep. Since then the attacks have steadily increased in frequency, but are not so severe as the first one. The attacks came on without warning, and he either falls to the ground, or if he has time to get hold of some support he lowers himself down and remains quiet until the attack has passed. He does not lose consciousness. His head appears to spin round and objects seem to rotate in a vertical plane. He vomits unless he keeps his eyes shut, and if he attempts to move he gets marked deviation to the left. He has to lie down for four or five hours for each attack. He has continued tinnitus in the left ear, which is also deaf. The attacks occur much more frequently from March to November. On examination the patient's blood-pressure was found to be 110. His heart, lungs, etc., were all normal. There was no Rombergism; his gait was steady, with no deviation and no ataxia. No nystagmus in the left eye. (The right eye is an artificial one.) Caloric tests: The left ear syringed with water at 60° F., nystagmus to the right. The right ear ditto, nystagmus to the left. Rotation, clockwise, vertigo and nystagmus for ten seconds. Counter clockwise, no vertigo, nystagmus for three seconds only. Operation, October 30: Complete vestibulotomy. One must not forget that this patient is at the time of year when he previously had the least vertigo. The case is shown chiefly to demonstrate the ease with which a patient of his age is able to tolerate the operation.

Mr. SOMERVILLE HASTINGS asked what guided Mr. Lake in his selection of cases for operation. As he was known to have operated upon a number of such cases, mostly with complete success, it would be useful to know, briefly, in what way he selected the cases for the operation.

Dr. A. GRAY asked if there had been a Wassermann reaction taken. The right eye was an artificial one, and it would be interesting to know what it was removed for. He had felt some curiosity as to how many of these cases were syphilitic, and how many were not.

Dr. MILLIGAN asked as to the ætiology, as no reason was given for the trouble; 110 was a low blood-pressure for a patient of his age. Was such a case likely to be due to progressive thrombosis? He asked the patient whether he had had any attacks of vertigo since the operation, and he replied that he had had none. That was a very satisfactory result for such a difficult class of operation. He had operated upon several such cases. Many of his patients suffered a good deal from shock shortly after operation, and did not get rid of their vertiginous feelings for two or three weeks. After clearing out the bony cavity, he asked what method of disinfection or otherwise Mr. Lake carried out: such a little matter often made a great difference in regard to the destruction of the end-organ.

Dr. A. GRAY said the case had interested him deeply, and he would like to know whether information could be given as to the patient's muscular tone. Ewald and some others had said a good deal about muscular tone being controlled by the semi-circular canals, but he had not much belief in the idea. Of course, the shock from this or any operation would affect the muscular tone long afterwards. Ewald said the skeletal muscles derived their tone from the "tone labyrinth." A vestibulotomy, especially a double one, should, on this idea, leave the muscular tone greatly affected. Mr. Lake had a case on which he did a double vestibulotomy, and he remarked that the muscular tone was not affected at all.

Dr. FITZGERALD POWELL would like to hear about the character of the man's deafness, and what was found at the operation: whether he had mastoiditis, and what was the character of the ear trouble, if any.

The PRESIDENT (Mr. RICHARD LAKE) replied that he was much averse to operating on this man, because of two things: he was aged sixty-one, and his blood-pressure was very low. He had never felt certain whether these cases should be operated on when the blood-pressure was low. He would not operate on any man who was not absolutely deaf on that side, or at least practically deaf. Secondly, to justify operation the labyrinth should be an active one. All extraneous causes of vertigo must be eliminated; they were now fairly well known, and it was not now really difficult to avoid making mistakes. One of his cases had some vertigo afterwards. The present was his sixteenth. With regard to muscular tone, von Stein, of Moscow, made a good deal of this, and for a long time he (Mr. Lake) tested the point, trying the grip of patients, and so on, and he concluded that in this, as in statistics, one could elicit what one specially wanted. The patient's right eye was lost owing to glaucoma. With regard to ætiology, it was chiefly owing to the uncertainty of this that he hesitated about operating; and he prepared his mind for failure. It was quite likely that the cause was progressive thrombosis. With regard to shock, he never used the hammer in the operation, so that no concussion was produced, and he thought that omission materially reduced the amount of shock. After having opened up above and below the facial nerve and scraped out, as far as possible, the whole of the internal surface of the vestibule, he wiped out the whole cavity with commercial formalin, by means of cotton-wool wound round a steel probe, in that way destroying every fragment of nerve-ending which was exposed. The nerves themselves were carried in bony canals in the vestibular wall, so it was necessary to scrape fairly hard. He did not take the Wassermann

reaction. This patient was absolutely deaf to all aerial sound-waves on the affected side, though he had some bone-conduction, which was not materially altered.

Demonstration of Photographs showing Sound-waves as produced by various Musical Instruments.—Richard Lake.—The photographs exhibited were taken by Mr. W. Duddell, F.R.S., by a method devised by himself. For many years the exhibitor had been trying to get photographs of sound-waves, but could not succeed until Mr. Duddell was kind enough to take this series by means of an instrument which had a period of its own. There was nothing in Nature which had not a period of its own and which did not vibrate to some musical note. The instrument with which these photographs were taken had a period of 760 vibrations per second, consequently the harmonics of this order were magnified, hence the curves could not be taken as absolutely correct, but the slight inaccuracy would probably not interfere with the interest. A complete octave could not be shown. As one approached the note produced by 760 vibrations per second exaggerations were noted, but in proportion as one receded from the fundamental tone the instrument became truer.

Hæmatoma Auris; Operative Treatment.—G. J. Jenkins.—Female, aged thirty-two. The hæmatoma was the result of a blow received on December 19, 1913. When seen next day the swelling involved the whole of the internal surface of the cartilaginous part of the pinna, and was about the size of a hen's egg. The margin of the helix could just be distinguished. On December 20 an incision was made along the margin of the helix. The contents were mostly fluid blood; some clots in lower part. The blood was on the external surface only and extended somewhat into the meatus. The present condition seems to justify the operative procedure.

Dr. MILLIGAN said the case raised the important point as to whether it was advisable to incise a hæmatoma so soon after its occurrence. Mr. Jenkins incised this on the day following its formation, and he asked whether that was deemed to be the best line of treatment. Was it not better, in such an early case, to try very gentle massage, cold compresses, ice, etc.? Though this result was good, there were always risks in incising hæmatomata. He had tried pressure between two layers of Gamgee tissue, and an elastic bandage over the head, and the result had been good.

Mr. KISCH asked how long Dr. Milligan's cases took to recover. He thought Mr. Jenkins was to be congratulated on the rapidity of the healing in his case. His experience was that they took a long time to subside if left alone, and consequently any method which shortened the time of healing was advisable.

Mr. JENKINS replied that he had sent the case hoping that the point raised by Dr. Milligan would be discussed. He had no experience to show how long blood in this situation required to clot. By opening up the hæmatoma twenty-four hours after the injury and clearing out the blood, one avoided secondary bleeding, and should be able to get the perichondrium in close relation with the cartilage once more. If this hæmatoma had been left alone, there must have been more organised material to contract later on than under present conditions. If he were to have a similar case he would like to procure a cast of the opposite ear, and get a sculptor to produce a negative to put on the affected ear, and so ensure the perichondrium being in accurate apposition. After making

the incision in this case he took great care to pack the perichondrium in close apposition to the cartilage, but even when carefully putting on the bandage the dressings were liable to slip, and so disturb the parts. He had seen aspiration of blood-cysts carried out, but the result had not been anything like so good as that in this case. There was still some thickening left—possibly from perichondritis, or may be blood.

Case for Diagnosis.—Somerville Hastings.—A clerk, aged thirty-four. No family history of deafness. Though living in South America he had never had malaria. Fourteen years ago he met with an accident cycling, and was unconscious for four hours. He had no bleeding from nose or ears, but kept his bed for a fortnight. After this he was completely deaf in the right ear. Early in January, 1913, he states that he noticed that the hearing of the left ear became impaired, but this only lasted a couple of hours. Three weeks later he had a feverish cold, and in forty-eight hours the hearing of his left ear, which had previously been quite good, was completely lost. He was slightly giddy at the time and suffered from slight giddiness a few days later. He had never had ear discharge. The patient appears to be completely deaf. He hears nothing by air-conduction, and it is probable that he only feels the vibration when tuning-forks are placed on his mastoids. Both labyrinths react normally to irrigation with cold water. On rotation to the left, rotatory nystagmus to the right. Rotation to the right produces left nystagmus. In neither case is giddiness produced. On catheterisation air enters both tubes readily. Wassermann's reaction is negative. By way of treatment, iodides, pilocarpine injections and blisters have been tried. Recently, at the patient's urgent request, I have applied radium on the right over the mastoid and on the left in the meatus. Though there have been very definite reactions on both sides no improvement in hearing has resulted. The exhibitor invited suggestions as to the pathology and treatment of the case.

The PRESIDENT said this was one of the cases where one felt the disadvantage of saying whether a patient could hear in the midst of the other noises which were going on. He had a suspicion that it might be some functional trouble. The Wassermann reaction should be done independently by two or three people. Negative results were not so definite as positive ones.

Mr. SCOTT recollected having seen this patient a month or more ago and had then tested the hearing with the tone series apparatus and monochord. The patient was at that time absolutely deaf by air- and bone-conduction throughout the whole tone range. The rotation tests still give normal reactions. He, too, would very much like to know the pathology explaining this deafness.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

December 5, 1913.

DR. D. R. PATERSON, *President, in the Chair.*

Three Foreign Bodies, the Colour of which made Extraction more Difficult.—D. R. PATERSON.—(a) *Reddish seed from the bronchus.*—A child, aged four, admitted in April, 1913, was said to have aspirated

a small stone which she had in her mouth. There was some cough and wheezy breathing. Nothing was seen by radiography, but there were signs on the left side of the chest with impaired breath-sounds. When the child was going under the anæsthetic retching came on, and breathing stopped. It was surmised that the foreign body had got displaced into the glottis, and, as the child was in imminent danger, tracheotomy was done, with immediate relief to the respiration. The interior of the larynx presented a more or less uniform redness, and this puzzling appearance was explained when the foreign body, on extraction, proved to resemble closely in colour that of the laryngeal mucosa. It was a seed $\frac{3}{8}$ in. long, having a red, polished covering. (b) *Pink ring from the gullet*.—A child, aged two and a half, seen last Boxing Day. It had swallowed a ring, said to be white, concealed in a Christmas plum pudding. The X-ray plate showed it opposite the sternal notch. On passing a tube down, what looked exactly like a transverse cedematous fold of mucosa was difficult to explain until careful exploration made out that it was the ring, not white in colour, but pink. It proved to be 1 in. in diameter—the size of a halfpenny. (c) *Portion of red vulcanite tooth-plate from the gullet*.—A man, aged twenty-three, admitted in January, 1913, was said to have swallowed, two days previously, half a vulcanite tooth-plate with two teeth attached. An attempt made by his medical attendant with a coin-catcher was given up on the occurrence of bleeding. On examination the œsophageal mucosa, a little below the sternal notch level, was red and cedematous. The red plate was somewhat difficult to make out until the white tooth was localised, and then the bearings were easily obtained. On extraction it was found to have only one tooth left, the other probably having been pulled off by the coin-catcher. It measured $1\frac{1}{2}$ in. by 1 in., and had sharp corners. Alongside these I have placed a fragment of nut-shell removed from the bronchus (reported to the Section, March, 1907), also showing the reddish colour which made it difficult to distinguish from the inflamed mucosa around it.

The cases represented one of the difficulties connected with the extraction of foreign bodies—namely the close resemblance of their colour to that of the mucous membrane—so that it was difficult to distinguish them. At the last meeting emphasis was laid on the importance of carefully considering the history; these cases showed, on the other hand, that statements as to the nature of the foreign body must be accepted with some reserve.

Epidiascopic Exhibition of Skiagrams and Diagrams of Pharyngeal Diverticula.—**William Hill.**—Thirty slides in all were shown, made up of the following: (a) Pictures of some typical post-cricoid pouches in the London Museums. (b) Diagrams by Killian, Keith, and the exhibitor illustrating the anatomical relationships of those herniæ which protrude between the upper or oblique and the lower sphincteric or transverse fibres of the inferior constrictor. (c) Skiagrams of five cases recently seen by the exhibitor: three patients were females; only one had submitted to operation, the pouch being successfully removed. (d) Skiagrams illustrating the method of finding the mouth of the œsophagus by means of a "shotted" string. (e) Skiagrams illustrating circumferential dilations above structures of the gullet, which in some points simulated the radiographic appearances and symptoms of post-cricoid pouches.

Pharyngeal Diverticulum.—**Patrick Dempsey.**—The patient from

whom the diverticulum was removed complained of all the typical symptoms of this condition. He was very emaciated, and for the past eighteen months had increased difficulty in swallowing, with regurgitation of food after meals. He was aged fifty-four. Examination with X rays, and by the direct method, demonstrated clearly the presence of the pouch, in the usual situation on the left side of the neck. An incision along the anterior edge of the left sterno-mastoid, followed by a little dissection, exposed the œsophagus from the extreme beginning of which the diverticulum originated. This latter, which was quite free, was next clamped as close to the site of origin as possible, and removed. The cut end was closed by a continuous suture, and then two "traction" sutures inserted in the wall of the gullet immediately above and below the beginning and end of the continuous suture already made. This enables one to pull the œsophagus up into the wound,¹ and facilitates the passing of the second row of sutures which engage the muscular coat only. A drainage-tube was inserted in the neck wound, and for the following five days the patient existed on saline enemata, with sips of sterile water, mixed with a little listerine. On the resumption of feeding by the mouth there was a slight leak round the drainage-tube for seven days, but after this nothing came through, and the patient made an uneventful recovery. Six months later he was in perfect health and had put on 20 lb.

The PRESIDENT had found extreme difficulty in such cases in finding the opening into the gullet; in one case he had several sittings, and carefully searched all over, without result. He asked whether, in the cases where the pouches had large mouths, the width of the mouth added to the difficulty and the risk of the operation: some of those illustrated seemed to be practically continuations of the pharynx. He knew two persons who had had such a pouch for years, yet got along fairly comfortably. They had both declined operation because they were not in robust health; but they had to renounce their social duties because of their difficulty of swallowing.

Mr. WAGGETT drew attention to the diagnostic method described by Dunham and Plummer in which a swallowed string and tube were employed. He had three or four patients with this condition, who, however, lived happily if they syringed out their pouches after food with a Higginson's syringe.

Mr. HERBERT TILLEY could sympathise with the statements of the President. The difficulty he referred to was a real one. Three weeks ago he examined an œsophagus by the direct method. There was some difficulty in swallowing, but very little swelling in the neck. He suspected a "pouch" because of the gurgling sound made by the patient, even during ordinary conversation. At the first attempt he passed the tube easily down the gullet, almost into the stomach, but saw nothing abnormal. He removed the tube and passed it again, but could not enter the gullet, although he was able to get into the opening of the pouch, and with his disengaged hand was able to squeeze from the pouch old evil-smelling *débris* of food. The pouch was on the right side, and the patient had had it many years. She declined operation.

Dr. DUNDAS GRANT said that in two cases of the kind he had had to deal with the pouches pointed on the right side. Both were operated upon, one successfully, but the other died.

Mr. T. B. LAYTON asked as to the after-history of the case operated

¹ W. Taylor, *Trans. Acad. Med. Irel.*, 1909.

upon. He had heard that the condition recurred because the spot at which one sewed the pharynx wall was weak, and therefore bulged.

Mr. NORMAN PATTERSON said he had assisted in operating upon a case in which the patient seemed, clinically, to have a sac on the left side. When a skiagram was taken it appeared to be mesial and extended to the suprasternal notch. At the operation it was found situated on the left side and was quite small; it did not extend farther down than the lateral lobe of the thyroid. The skiagram of the distended pouch was, in that case, misleading.

Dr. MAURICE HAYES said the last slide shown by Dr. Hill was that of a typical case. In that patient the pouch was on the right side. The second slide, which was not so characteristic, was that of the patient from whom the specimen passed round was taken. The operation was performed by Mr. Dempsey. The other case was not operated on. He did not himself operate, but he made the X-ray examination.

Mr. FITZGERALD POWELL asked Dr. Hill if he knew what was the mortality after operation? If it was not high it seemed a pity to leave a patient with a big sac of the kind to cause so much discomfort.

Mr. E. D. DAVIES, in reply to the question of recurrence after operation, stated that three years ago he collected records of a number of cases in connection with a report on Mr. Waggett's case. He personally wrote to try and obtain their history, but with the exception of Sir Henry Butlin's and Mr. Bilton Pollard's cases, he could not get it; they had all disappeared. Seven of Sir Henry Butlin's cases were quite well a few years after operation, and Mr. Bilton Pollard's case was well two years later. They had operated by excising the sac. Girard, of Berne, operated on two, and Halstead on one, by inverting the sac and ligaturing its neck. The after-history of these cases was not procurable. Mr. Waggett inverted the sac and ligatured it in his case, but some months later a recurrence took place and then the sac was excised. The patient was a vagrant, but when last heard of he stated he could regurgitate a little food amounting to about the size of the top of the thumb.

Dr. HILL, in reply, said he was not surprised to find that others had had difficulty in finding the pharyngo-oesophageal opening with the endoscope, which tended to pass into the pouch; to obviate this he used the "slotted" string, which when swallowed could be seen by the X-ray to be anchored in the intestine, and traction could then be made and the string used as a guide for intubating the gullet before and after operation. The operation mortality in sixty cases collected by Stett in 1910 was something over 15 per cent., but as many operation cases had probably gone unrecorded, more especially the fatal ones, the percentage was probably double that figure. With the improved method of operating in two stages and the use of an intubation apparatus till leakage had ceased, the mortality should be reduced almost to vanishing point. Of those cases which recovered the symptoms were usually reported as cured, which militated against the view that stricture of the mouth of the gullet was the cause of the dilation of the pharynx and subsequent formation of the hernia between the fibres of the inferior constrictor. General toxæmia from intestinal stasis was said to result in some unoperated cases unless lavage was regularly carried out.

Sarcoma of the Nasopharynx treated by Radium Emanations.
—Herbert Tilley.—Male, aged twenty-two; first noticed a "blocking of the nose" four months ago. There was no headache nor any pain in or around the nose. An operation for the removal of enlarged glands in

the right side of the neck was carried out in a military hospital in September.

The exhibitor first saw the patient on October 28 and noted the following points: Patient was very pale, and his voice was that of a young man with complete nasal obstruction. The soft palate was pushed forward into the mouth and was almost vertical in position. Behind and reaching just below its free margin a large tumour could be seen, which completely filled the nasopharynx, and the lower rounded border of the mass presented a greyish-white ulcerating surface, from which when manipulated blood oozed freely. A small portion of the growth was removed for histological examination. Digital examination of the growth proved that the tumour had a broad base which occupied the whole posterior wall of the nasopharynx, the only free portions being its lower rounded surface and that which was in contact with the soft palate. A large, soft, painless, ill-defined glandular mass was present under the left ramus of jaw. Two "emanation" capsules, each containing the equivalent of 40 mgrm. of radium bromide, were inserted through the anterior surface of the growth about 1 in. apart and left *in situ* for twenty-four hours. The patient returned for examination in a week, when the whole mass had entirely disappeared. The appearance of the nasopharynx was as if a large adenoid mass had been removed a few days previously.

On November 25 the patient expressed himself as feeling quite well: all signs of the growth have disappeared, and only a small gland can be detected under the left ramus of the jaw.

Sarcoma of the Nasopharynx treated by Radium Emanations.

—A. J. Martineau.—Male, aged fifty-nine, came at the beginning of October, complaining of deafness of five or six weeks' duration. On examination the left drum was seen to be retracted, the left side of the nose, of which the cavity was wide and mucous membrane wasted, was filled with crust, and there was similar material in the post-nasal space. This condition of the nose had existed many years. A catheter could not be passed into the left Eustachian tube owing to an obstruction in the choana. The soft palate was not quite symmetrical, the uvula being near the right side.

Examined under anæsthetic on October 18 the nasopharynx was found to contain a firm rounded swelling in its left half. The base seemed to be in the fossa of Rosenmüller of the left side; it projected forward into the left choana, and crowded the Eustachian cushion outwards and forwards. The prominent portion of the growth was removed, and reported to be "definitely a large round-celled sarcoma with practically no other tissue present." Between October 18 and November 14 he had on four occasions X-ray treatment. Examined under anæsthetic on November 14 the growth was softer in character. A tube of radium, approximately equal to 47 mgrm., was inserted from the front through the nose, and retained twenty-four hours. The patient experienced relief in about four or five days, and lost his deafness, and the nose became clearer. At the present time the breathing is free and the palate symmetrical: the hearing is good. A raw-looking, ragged surface can be seen from the front. January 5, 1914: This has now healed, and there is no visible growth.

Sarcoma of the Nasopharynx treated by Radium Emanations.—Somerville Hastings.—The patient is a labourer, aged twenty-nine. On August 11, 1913, he came complaining that for six months

he had had bleeding from the throat, that for five months he had been deaf in the right ear, and that for three months he had been entirely unable to breathe through the nose, and for the same time had lost all sense of smell. On examination there was a firm, smooth, pinkish tumour filling up the nasopharynx and pushing the soft palate in front of it. The area visible from the mouth was covered by large veins and bled easily if touched. The man was deaf on the right side and the right membrana tympani was retracted. On August 14 I examined him under an anæsthetic. With considerable difficulty I insinuated my finger between the soft palate and the tumour, and found that the latter was growing from the whole of the posterior wall of the nasopharynx and was firmly adherent to it. A small piece was removed for microscopical examination. The tumour is considered to be a small round-celled sarcoma. On August 25 a thin platinum tube, containing 82 mgrm. of radium bromide, was inserted into the growth through a small incision in the soft palate a little to the right of the middle line, and left in place for sixteen hours. After this treatment nasal breathing and sense of smell returned in five days, and the patient was able to hear with the right ear five days later. There was never any reaction seen in the mucous membrane of the soft palate on its buccal aspect. On September 16 all growth had disappeared, but there was slight swelling around the right Eustachian tube, and a slough of mucous membrane was visible at the junction of the soft palate with the right lateral wall of the nasopharynx. On October 10 I again saw the patient, who was quite well. The only abnormalities to be seen then were a small scar on the soft palate and a slight irregular, uneven scar at the junction of the posterior wall of the nasopharynx with its roof.

Dr. WATSON-WILLIAMS said one of the most striking features of a relatively short experience of the application of radium was the very different result obtained in sarcoma to that of cases of epithelioma and endothelioma. A few weeks ago he had a very advanced case of epithelioma of the hypopharynx—an utterly inoperable case. The patient had heard of radium and was very anxious to try it. A tube equal to 70 mgrm. of radium was procured and placed in the growth, and remained there twelve hours, when it was coughed out. Afterwards it was inserted externally in the glandular enlargement, and for a few weeks the patient experienced a very great degree of benefit, in that she could swallow food, but then she became worse again and died. Even in such cases radium was worth trying, if only to lessen the slow process of semi-starvation, but in cases labelled histologically sarcoma the benefit was much more lasting and might eventuate in apparent cure.

Mr. HOPE two years ago saw a patient who had a very large sarcoma in the nasopharynx, was deaf in the left ear, and could not breathe through the left nostril. One radium tube was put into the growth through the nose, and one up into the growth behind the palate. As there was much swelling of the throat, tracheotomy was done. Relief soon came: the tracheotomy tube was removed in eight days, and in a fortnight the growth was found to have practically disappeared. The deafness passed off and the nose-breathing became normal. He learned later that the patient had gone on well for eighteen months, that then he had dyspnoea, necessitating sudden tracheotomy, and a fortnight later died.

Mr. WAGGETT had had a case of chronic enlargement of the tonsil, the distress being so great that it was thought tracheotomy would be necessary. A tube of radium emanation was put into the mass, and left in

twenty-four hours, and in five days the growth had disappeared, and the tonsil was even smaller than its fellow. The macroscopical appearance was highly suggestive of sarcoma, but the microscopical findings were equivocal.

Dr. JOHNSON HORNE considered that it would not be wise to draw from the case exhibited the conclusion that sarcoma could be cured by radium. In the first place, one had to bear in mind that there was sarcoma and "sarcoma," and that it presented different degrees of malignancy. Some years ago he had expressed his conclusions that the nasopharyngeal tumours commonly called fibro-sarcomata were not sarcoma in a malignant sense, inasmuch as when allowed to run their course they did not kill by metastases, but by local destruction of adjacent structures; but that they were embryonic growths developing from the basisphenoid.

Dr. FITZGERALD POWELL pointed out that whether these growths in the nasopharynx were typical sarcoma or not, clinically they presented the features of malignancy, and were infiltrating the surrounding tissues. Those, like himself, who had endeavoured to eradicate them by operation, knew that the results were often very unsatisfactory, and great suffering endured before the end was reached. Accepting the reports of these cases as correct, he could only say that radium appeared to him to be a perfect Godsend in their treatment.

Mr. HARMER believed it was generally agreed that with both sarcoma and carcinoma of the upper air-passages there was occasionally a complete disappearance of the growth, or almost complete, shortly after the application of radium. But in nearly all these cases recurrence took place, and sooner rather than later. One case was that of a man who had epithelioma of the upper jaw at the beginning of this summer. Mr. Harmer removed the upper jaw freely, but there was a recurrence, and he found the man had a larger tumour than before, projecting over the face and filling the orbit, the eye having previously been taken away. He put all the radium obtainable into this mass, and left it there forty-eight hours. At the end of three weeks the greater part of the growth had disappeared, leaving a small fibrous lump in the roof of the orbit. He expected that the patient would remain well for a time if it did not bore into his cranium; eventually he would get the usual recurrence and succumb to it.

The PRESIDENT reminded members of the cases that had been brought up of sarcoma of the pharynx which were proved to have disappeared under treatment by arsenic. In one case the glands had been extensively removed by a general surgeon, and the patient came under his own care with a great enlargement of the tonsil. Sir Henry Butlin saw the case, and strongly dissuaded him from operating, but suggested giving arsenic. That advice he acted upon, and the growth disappeared. That happened ten years ago, and it was ascertained a few days ago that the man was still following his occupation. There were cases which disappeared under less heroic treatment than one would adopt for epithelioma.

Mr. HERBERT TILLEY, in reply, said he was careful to avoid saying his case was "cured"; he did not know whether that would be so. But six weeks ago the condition of the boy seemed as hopeless as it could be, while to-day anyone might think he was normal. He did not think such a result could have been approached by any other method. There was not only a large growth in the nasopharynx, pushing the palate forwards nearly to the teeth, but he had had repeated hæmorrhages, and was very anæmic and weak. When the boy presented himself a fortnight after

the application of radium he did not recognise him because he looked so much better. With regard to infiltrating growths, the nearer these approach embryonic tissue the greater the likelihood that radium may do good. In squamous epitheliomata of the mucous membranes radium seemed to do no good at all. He had seen many of the latter in the gullet, but though he had seen improvement in swallowing due to sloughing away of the central portion of the growth, he had seen nothing in the way of permanent cure.

Mr. MARTINEAU, in reply, said that he was told at the Radium Institute that he need not expect a good result in less time than a month; and so, since inserting the radium he had not seen the patient again until to-day. He would have liked to hear whether further radium should be used to prevent a recurrence, or whether one should wait to see what the result would be. The strength was 55 mgrm. when sent out, but probably it was 46 mgrm. by the time it was applied.

Mr. SOMERVILLE HASTINGS, in reply, said that the clinical picture in his case was exactly that described by Mr. Tilley. The patient looked like one suffering from malignant disease; he was thin and pale, had lost all sense of smell, and was deaf in the right ear. Whatever the exact nature of the growth, the result was so far satisfactory, and it was worth while trying the same method for all similar cases which were not amenable to operation.

(?) **Bilateral Abductor Paralysis.**—**T. B. Layton.**—*Case 1:* Male, aged forty-two, was admitted with a history of three weeks' dyspnoea, worse at night. There was some laryngitis and complete loss of abduction on both sides. Twenty-five years ago he had a sore on the penis, for which he was treated with medicine during two months; he had no rash or sore throat. The Wassermann reaction is positive. There are no other signs of locomotor ataxia. Tracheotomy was performed under local anaesthesia; he was given salvarsan, 0.6 grm., and is now on a course of potassium iodide with weekly injections of 1 gr. of mercury. There is now a considerable degree of abduction. He is wearing a tracheotomy tube with a plug, but he never has to take out the plug, even during sleep.

[*Note.*—Sir Felix Semon examined the case, and said that the power of abduction being now practically normal, he felt that the original diagnosis must be wrong, and that it must have been a case of syphilitic laryngitis. For he did not believe that, even with the modern methods of treatment which had been used in this case, the abductor fibres could have recovered so completely in two months. Considering the difficulty of diagnosis in such cases, this opinion should be put on record, rather than the case should be published as one of bilateral abductor paralysis which has definitely recovered in a short time.]

Case 2.—Female, aged forty-eight, attended the out-patient department because she makes a "whistling noise" when asleep. She says she gets shortness of breath easily, but has no orthopnoea nor is ever woken up by it. Thirty years ago she had an abscess which burst in the upper part of the front of the left chest; this she dressed herself and did not apply to a doctor for it. Twenty-five years ago she attended at the Brompton Hospital for three months. No evidence of phthisis was found, and the only other evidence of locomotor ataxia is that the tendo Achillis jerk is either difficult to obtain or cannot be got at all. Under the X rays no evidence of scarring was found anywhere in the region of the recurrent laryngeal nerves. There are no signs of syphilis in the

fundus or other parts of the eye, nor other signs of this disease about the body. The Wassermann test gave a weak positive reaction. On examination of the larynx there is bilateral abductor paralysis.

The PRESIDENT said he had a case in a man who had this lesion, and in whom on passing a tube there was found, at the root of the trachea, a tumour which had definitely pressed on the trachea; there was laryngeal paralysis owing to this pressure, and consequently a double cause for the difficulty of breathing.

Subglottic Swelling of the Larynx.—T. B. Layton.—A man, aged forty, came on November 28 with a history of increasing dyspnoea of two weeks' history, worse when lying down. On examination the glottis was reduced almost to nothing and the cords could not move outwards. That this was not a paralysis was shown by the fact that a bilaterally symmetrical swelling could be seen immediately below the cords. He was taken in and given salvarsan next morning, with the idea of saving an urgent tracheotomy and in the belief that the condition was syphilitic. Unfortunately no blood was taken for the complement-fixation test before this administration; the patient denies syphilis, and no other symptoms of the disease have been found. On the first night in the ward he made much noise while asleep; he now sleeps quietly, and has no dyspnoea when not exerting himself. The subglottic swelling has largely disappeared, the cords are pink and do not move well on inspiration, the subglottic region opposite the cords becomes diminished, the hinder end of the glottis becomes wider, showing that the arytenoid cartilages move and that the immobility is not due to paralysis. As there are now no urgent symptoms he is to be given a full course of mercurial injections and salvarsan on the Army system, and if this does not cure him a tracheotomy will be done to rest the larynx.

Dr. PETERS said he had seen salvarsan very usefully employed in two cases of obstructive syphilitic trouble; and it obviated tracheotomy. The relief was immediate, and contrasted with the results of potassium iodide, which at first increased the dyspnoea.

Mr. BARWELL thought it likely that this patient would continue to get deficient abduction for the rest of his life, because there appeared to be considerable scarring. Salvarsan admittedly worked wonders in these acute cases, but he was not sure that the intramuscular injection of a soluble salt of mercury did not act as well and almost as quickly.

Specimen of Thyro-glossal Cyst, causing Dyspnoea, in a Woman, aged fifty-four.—A. J. Wright.—This specimen was removed by operation, having giving rise to increasing nocturnal stridor and slight dyspnoea for two years. The cyst presented in the neck over the thyro-hyoid membrane, and extended inwards through the membrane, displacing the epiglottis backwards and concealing the larynx.

Mr. HERBERT TILLEY referred to a case in the hope that it might prevent others falling into the error he had committed. A man, suffering from difficulty in breathing, had a large cyst on the laryngeal surface of the epiglottis; it was so large that it prevented a view of the glottis. In colour it was a very pale blue and semi-translucent, and minute blood-vessels were seen coursing over the surface of it. He cocaineised it and proceeded to remove it by the direct method, when there was a gush of thin yellow fluid, and the cyst collapsed. He removed all he could of the cyst-wall, scored the inner wall with the galvano-cautery, and concluded that all would be well. But the cyst recurred in three or four weeks, and

the laryngoscopic view showed that things had reproduced themselves. The man also pointed out a swelling in front of his neck which was painful on pressure. He (Mr. Tilley) then opened from the outside, and let out a large quantity of pus. No doubt the laryngeal operation had infected a large cyst. As the cyst continued to secrete in spite of free drainage, by means of a difficult dissection the cyst was excised, and was found to lead into the region of the larynx. The patient eventually made an excellent recovery.

Laryngeal Case for Diagnosis (?) Tuberculous Perichondritis.

—**G. Potts.**—Male, aged forty-five, complains of a husky voice and a lump on the right side of his throat. He was quite healthy up to six years ago, when he had rheumatic pains in his joints. He dates his throat trouble to whooping-cough five years ago. There is no history of syphilis. Two sisters had died from tuberculosis. Twelve months ago he noticed the right side of his throat begin to swell in the region of the thyroid cartilage; for the past three months there has been no change in size. He has had no cough, and is not losing weight; is naturally thin. Chest examination shows signs of a healed cavity in apex of right lung. There is a swelling over the right side of the thyroid cartilage about the size of a pigeon's egg, fairly firm and slightly fluctuating. The upper border of the right ala of thyroid cartilage is ill-defined, but the cricoid and hyoid cartilages can be distinctly felt. An exploratory puncture has been made and $\frac{1}{2}$ oz. of greenish pus withdrawn. On microscopical examination the pus proved to contain no tubercle bacilli, and the culture was sterile. On palpating the thyroid cartilage after the puncture the outline of the right ala could be distinctly felt and there was a feeling of a depression in the cartilage. Laryngoscopic examination: the whole of the right and the posterior half of the left vocal cords are obscured by a swelling bulging into the ventricles. The arytenoids are red and swollen, as is the ary-epiglottic fold. There is no ulceration. Wassermann reaction proved negative. No tubercle bacilli could be found in the sputum.

Dr. DUNDAS GRANT said it was probably a case of tuberculosis of the thyroid cartilage, producing perichondritis in the first place, and then breaking down.

Mr. BARWELL agreed; he considered the case to be one of tuberculous laryngitis with perichondritis of the thyroid cartilage.

Vertical and Horizontal Gripping Forceps for use in various Tonsil Operations.—**James Donelan.**—These are a modification and, it is hoped, an improvement on those shown by exhibitor last session. They will be found useful, especially where deeply embedded tonsils have to be dissected out from between the pillars. The tonsil can be seized either vertically or horizontally as may offer the better hold. The spring then locks the forceps, and the tonsil is freed from its bed to the desired extent or is dissected completely out. If preferred, a snare or guillotine can be passed over the proximal end of the forceps on to the loosened tonsil and the operation completed in this manner.

A Combined Septal Resector, comprising Knife with Straight and Curved Instruments for raising the Muco-perichondrium.—**James Donelan.**—This instrument consists really of a blunt- and sharp-edged tenotomy knife on a longer handle than usual. This form was used originally by exhibitor for resections of the cartilaginous portions of the septum by flap operation, and has been constantly used since in

cases where only that part of the septum is deformed and in which it did not appear desirable to perform the operation by Ballenger's method. In late years he has added a Freer's curved, blunt spatula at the other end. The chief advantage claimed for the contrivance is that no time is lost changing instruments. This is a great gain, especially in cases in which from any cause the ischæmia is imperfect, and the operation can often be completed after swabbing without laying down the instrument. When the muco-perichondrium has been freed from both sides of "the bulge" by means of the blunt parts of the instrument, the bulge can then be quickly cut out by a process of transfixion and without the aid of angular knives.

Polycythæmia Rubra with Chronic Rhinitis.—**E. A. Peters.**—A coachman, aged fifty-eight, had suffered for four years with shortness of breath and high colour. Four years ago he was laid up three months with an attack of bronchitis. Two blood-counts gave 10,320,000 and 13,000,000 red blood-cells. There is marked emphysema present. The nasal mucosa is dark red and swollen; it causes considerable obstruction to breathing. He has been treated with pot. iodid., sod. sulphat., and vaso-dilators. Local nasal treatment gave little relief, so an anterior turbinotomy was carried out on the left side after giving 20 c.c. of normal horse-serum by mouth for five days. Vaseline gauze was packed in the nostril and retained for twenty-four hours, when it was removed and followed by oozing, which necessitated replugging two days later. At no time was the hæmorrhage alarming, though excessive. The treatment was undertaken to relieve the patient, as he was suffering from obstruction of the nose, and, although there was fear of hæmorrhage, it was thought that slight puncture might help in a measure. He gave the horse-serum by the mouth, as it was found to be an excellent way of preventing hæmorrhage. He thought it would be advisable to operate on the other side.

Dr. F. DE HAVILLAND HALL said the bleeding would very likely, in itself, benefit the patient a good deal. Some of these cases of polycythæmia had been benefited by the withdrawal of 8 to 10 oz. of blood, repeated every two or three months.

Infiltration of both Vocal Cords; Deflected Septum.—**E. A. Peters.**—A bandsman, aged twenty-three, lost his voice in January: at the same time fell away in weight, but no sputum was observed. The voice has recovered from time to time. There is no history of syphilis or evidence of tuberculosis. Both cords are infiltrated superficially and present a mottled, rugose surface.

Dr. JOBSON HORNE noted that there was defective nasal breath-way. That he regarded as a factor in the laryngeal condition and considered that it should be remedied, more particularly as he understood that the bandsman played a wind instrument.

Sir STCLAIR THOMSON said he wondered whether the question of tuberculosis had been entertained. Both cords were superficially ulcerated, and there was a very mouse-nibbled appearance on both sides. Even if no constitutional affection could be traced, he would still be suspicious of it being tubercle, in an early stage.

Dr. PETERS replied that it was an interesting problem as to whether the condition was tuberculous, or a case of the very rare hypertrophic laryngitis.

Swelling on the Left Vocal Cord for Diagnosis.—**H. D. Gillies.**—A man, aged fifty, has noticed huskiness of the voice since March, 1913.

The patient was singing extra loud at a choir practice, and two days later, on reading in the church his voice gave out, and he was unable to continue. Since then there have been various degrees of loss of voice. General health good. Patient has suffered from nasal and post-nasal catarrh. There is deflection of the nasal septum. No sputum can be obtained. Wassermann reaction is negative. A grey swelling on the left vocal cord is surrounded by an area of inflammation. At the anterior end are two reddish nodules. There seems to be a patch of inflammation below the left vocal cord. The movements of the cords are free.

Dr. JOBSON HORNE said it was an unusual case and one about which it was not easy to express a very positive opinion. By a process of elimination, however, it was possible to arrive at a diagnosis. Tuberculosis and syphilis might be excluded. That reduced the diagnosis to an innocent or a malignant growth of the left vocal cord. The growth was situated in the part of the cord where an epithelioma would develop. Moreover, the movement of the left cord was not so free as that of the right cord.

Sir FELIX SEMON agreed with Dr. Jobson Horne. He had shown an illustration of a case exactly like the present one on the epidiascope before the International Congress at Budapest. The patient was a man, aged about fifty, who had a semi-transparent globular swelling on his left vocal cord, with a slightly granular surface. It remained perfectly stationary for eighteen months, during which he examined the patient at intervals. Then all at once its nature seemed to change, it became malignant, and thyrotomy was performed. In the present case, as Dr. Jobson Horne had said, the movement of the left cord was defective, and this, of course, did not augur well. Still, there was a distinct history of the hoarseness having suddenly arisen after a big vocal effort, and it was certainly possible that the internal thyro-arytænoid muscle might have been injured, which also would explain the curious appearance of the left vocal cord. He hoped the case would be shown again later.

Dr. HARRISON had seen a case similar to this eighteen months ago, and on removal the specimen was definitely epitheliomatous.

Epithelioma of the Soft Palate; Operations.—Norman Pater-son.—Male, aged sixty-five. About the beginning of May, 1913, he first noticed some difficulty in swallowing and pain in the throat. On examination of the throat a growth was seen involving the uvula and free margin of the soft palate on the right side. There were no enlarged glands. Treatment was carried out in three stages, and consisted of an extensive dissection of both sides of the neck and free removal of the primary growth. An interesting point about the case was the absence, on the right side, of the internal jugular vein. It was represented by two insignificant vessels with numerous cross connections. The jugular on the left side was abnormally large. Since leaving hospital in August the patient has had X rays applied at frequent intervals as a prophylactic measure.

Tooth-plates and Meat-bones removed from the Œsophagus.—Thomas Guthrie.—These were shown in order to illustrate the ease with which a vulcanite tooth-plate is detected by a good skiagram and the much greater difficulty of demonstrating the presence of a meat-bone by this means. The exhibitor had been informed that a vulcanite tooth-plate in the œsophagus could always be discovered by an adequate X ray examination. That foreign bodies of this nature were not infrequently

missed was due to a faulty technique on the part of the radiographer. One of the tooth-plates shown, which the skiagraph demonstrated with clearness, had been overlooked in another hospital, and in another case the tooth-plate was only visible on screen examination, when a diaphragm was employed so that a small part only of the chest was examined at one time. Meat-bones, on the other hand, were much less opaque to the X rays, and two fairly large pieces which the exhibitor had removed from the œsophagus manifested their presence only by the arrest of a small quantity of a bismuth meal.

Trauma from Adenoid Operation.—**H. L. Whale.**—The patient stated that her adenoids were removed two years ago. She now had a trellis-work of adhesions between the Eustachian tube and the pharyngeal roof, probably the result of lateralising the curette.

Dr. PETERS said he would like to join issue with Mr. Whale as to the condition being due to lateralising the curette. He believed it was caused by the finger-nail being used to stir up the fossa of Rosenmüller. The best way to deal with these adenoids, which were mostly on the anterior wall, was by means of Meyer's ring knife. If that had been used in this present case he did not think the condition now seen would have been present.

Mr. NORMAN PATTERSON said the condition was very common.

The PRESIDENT did not think the condition was due to lateralising the curette, because with the old Hartmann's curette, which most men began with, the condition was but seldom seen.

Sir STCLAIR THOMSON said there was no trace left of adenoids. In the days of the old Society there were repeated discussions as to conditions found in Rosenmüller's fossa, and he did not agree that it was necessarily due to lateralising the curette. These bands did not cause symptoms, and the suggestion of some members to put such patients under chloroform and break down these adhesions because there was some middle-ear catarrh was not justified by results.

Dr. DUNDAS GRANT said there were shown in the Laryngological Society several cases in which there had been no operation in the nasopharynx at all, and in which such bands were present. It was probably in the natural involution of the adenoid tissue that, in favourable circumstances, the stringed form was seen.

Aphonia ; (?) Congenital Syphilitic Laryngitis.—**W. H. Jewell.**—Boy, aged fourteen; loss of voice said to have begun five years ago, following scarlet fever. Boy speaks with forced whisper. The ventricular bands are infiltrated, obscuring the anterior halves of the cords. Arytenoids also swollen. The glottis is unclosed on phonation. There is no evidence of tuberculosis. Wassermann reaction positive.

The PRESIDENT said the patient had some nasal trouble and there was a good deal of laryngitis, and some crusts were present, and he would like to know if the patient had congenital syphilis.

Mr. E. D. DAVIS asked whether tuberculosis was likely. The condition of the ventricular bands, the general appearance of the larynx, and the presence of sputum on the posterior commissure were suggestive of tuberculosis.

Sir STCLAIR THOMSON did not think an opinion could be given until the nose had been treated. It was common to see cases like this which were simply hypertrophic laryngitis infected from the nose or post-nasal space.

Dr. JEWELL replied that his idea of congenital syphilis was strengthened by the rapid improvement under iodide and mercury. The voice also had improved.

(?) **Tuberculous Ulceration of Pharynx.**—**F. W. Bennett.**—W. H.—, tram-conductor, aged twenty-seven. Ulceration in right pharynx. Four months ago, hæmatemesis (?). For several weeks, and especially during the last three, has had severe pain on swallowing. No chest trouble detected. Von Pirquet's reaction negative. No history of syphilis. Wassermann's test not yet made.

[*Note.*—Shortly after the meeting general pulmonary tuberculous inflammation supervened, causing death in about three weeks.]

Sir STCLAIR THOMSON said the case was of much interest, and required to be gone carefully into. Still, he thought the diagnosis might be reduced down to either syphilitic disease or pemphigus. No pemphigus was found anywhere else, but it was difficult to find the bleb of pemphigus actually out. Even in some fatal cases the bleb had not been seen. He suggested that scrapings should be taken and investigated from the point of view of tubercle or pemphigus.

Dr. DUNDAS GRANT said there was an appearance like that seen in the later stages of tuberculosis, in a more diffuse form. But the intense pain, and the miliary appearance, in spite of the fact that there was leucoplakia on the tongue, made one favour a diagnosis of tuberculosis. Investigations of scrapings were necessary.

Mr. HERBERT TILLEY thought it was tuberculous, because the epiglottis was oedematous and turban-shaped, and the lesion in the throat was very painful.

Extensive Pharyngeal Growth.—**Herbert Tilley.**—The patient was a woman with an enormous growth occupying the whole left side of the mouth and pharynx. It had existed for sixteen years, and was almost certainly not malignant. Mr. Tilley suggested puncturing it to find if it contained fluid. If not, radium might be tried.

Mr. T. B. LAYTON said the lump in the parotid region was part of the tumour. There was a swelling beneath the angle of the jaw continuous with the mass in the mouth; from this a process came round the posterior margin of the jaw which was continuous with the parotid mass. He thought it was a cyst arising in the pharyngeal wall, which bulged the palate down, and that it contained fluid.

Carcinoma of the Pharyngo-Laryngeal Party Wall.—**C. I. Graham.**—The case was shown in May, 1910. Operation: Total laryngectomy, May, 1910. Shown again at the meeting of the Section in February, 1911. Recurrence noticed October, 1913.

Sir STCLAIR THOMSON said that this having returned after a period of three years showed that extrinsic cancers did not follow the rule laid down by Sir Felix Semon for intrinsic growths. He had found that an intrinsic cancer which did not recur within a year did not come back at all. He advocated radium in this case.

Chronic Laryngitis in an Unusual Form.—**Andrew Wylie.**—The patient, a man, aged forty, by occupation a commercial traveller, a year ago contracted a cold, since when he has been hoarse, becoming gradually worse. Otherwise the patient is healthy. There is no loss of weight, no cough, no spit; nothing abnormal is detected in the lungs. Wassermann test is negative. Family history good. There is a redness of both vocal cords, swelling of the right ventricular band, and, at the

posterior end of the right vocal cord, extending into the inter-arytænoid space, a considerable number of little papillary elevations. Slight swelling of the arytænoid cartilages. The exhibitor intends to apply the galvanic cautery to the small papillæ, but shows the case in order to discuss this treatment.

Dr. DUNDAS GRANT said there were curious warty growths in the inter-arytænoid space. He had only seen an identical appearance in a tuberculous subject, who also had had syphilis—a comparatively young man.

Sir STCLAIR THOMSON suggested further research from the point of view of tuberculosis. There were not only papillary growths, but a breach of surface in the favourite areas for tubercle. When the patient was made to phonate, infiltration was seen in the arytænoid regions, and then one saw there was asymmetry, showing it was not physiological thickening, but probably a tubercular process.

Mr. WYLIE replied that he would endeavour to obtain some scrapings from the larynx, and investigate further with the view that it might be tuberculosis. Some of the members thought the case might be malignant.

Fungating Tumour of Tonsil.—Harold Barwell.—Boy, aged sixteen. Vaccination three weeks ago, followed by septic arm, fading, purplish eruption on left leg; vaccination marks unhealthy. Sore throat five days ago, no soreness or fever now. Right tonsil converted into large fungating mass with everted edge and very hard base. No enlargement of cervical glands.

Dr. PETERS said he had seen a similar condition, though not so marked, when everted follicles had become septic.

The PRESIDENT said if there had been a rapid history one would suggest sarcoma, especially as it was very firm, and did not look like an inflammatory condition.

Mr. BARWELL replied that the base of the lesion on the tonsil was hard, and it felt and looked like epithelioma. He would report later on the case.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Meeting at the Royal Infirmary, Edinburgh, November 22, 1913.

MR. J. D. LITHGOW *in the Chair.*

Reported by DR. W. S. SYME.

(Continued from p. 99.)

Epidiascopic Demonstration of the Pathological Anatomy of some Cases of Ear Disease, with Short Histories of the Cases.—**J. S. Fraser.**—(a) *Ostitis vasculosa or otosclerosis (?)* affecting the labyrinth capsule. The case was one in which chronic suppurative otitis media was combined with cholesteatoma. Death occurred from temporosphenoidal abscess.

(b) *Acute Suppurative Otitis Media with Labyrinth Fistula*.—Male, aged twenty-eight, miner, suffered from coryza and earache in March, 1911; two weeks later discharge from left ear, with diminution of pain; discharge has continued. *Examination* (April 22, 1911).—Left meatus; pus and bulging of posterior part of membrane; no tenderness of mastoid. Patient did not report again till July 1, 1911, when he stated that discharge almost ceased and pain disappeared shortly after previous visit. On June 24, however, he had an attack of giddiness, with apparent rotation of external objects; patient could not stand on account of giddiness. June 27: Increased giddiness; loss of sleep; increase in discharge from left ear. July 1: Patient seen and admitted. Severe frontal headache; pain behind left ear; loss of balance; vomiting; temperature, 102° F.; pulse, 60; marked nystagmus to right (sound side); no nystagmus to left. Patient too ill for functional examination; rigidity of neck; Kernig present; fundus normal; no ocular paralysis; mental condition good. *Operation* (July 1).—Radical mastoid. Process diploëtic; pus in antrum (pneumococcus?); labyrinth-wall not perforated; erosion of external canal; cerebro-spinal fluid under tension and turbid, but sterile on examination. July 2: Headache less severe; no vomiting; temperature, 101.6° ; pulse, 56; nystagmus as before; Kernig present; rigidity of neck; knee-jerks absent. July 3: Second lumbar puncture; fluid gave growth of a streptococcus. July 5: Patient restless; temperature, 102.7° ; heroin given. Third lumbar puncture; many streptococci. July 6: Epileptiform fit: in spite of sedatives patient could not be controlled. July 7: Continuation of fits; death. *Post-mortem*.—Tuberculosis of right apex; purulent leptomeningitis at base; brain-tissue softened. *Ear*.—Fistula of external canal and acute purulent labyrinthitis.

(c) *Chronic Suppurative Otitis Media, Cholesteatoma, Labyrinthitis*.—Female, aged six; had discharge from left ear since measles at three. From December 25, 1911, to January 7, 1912, child was in bed with pain in left ear, vomiting, dizziness, and headache. From January 8 to 13, 1912, child was apparently cheerful. *Examination* (January 13, 1912).—Right membrane shows cicatrix; the left meatus shows pus and granulations; no mastoid tenderness; tonsils and adenoids enlarged. January 15: Adenoids and tonsils removed, and granulations in the right ear curetted. January 17: Vomiting; temperature, 103.2° F.; pulse, 160; patient cyanosed. January 18: Vomiting continues; giddiness; no mastoid tenderness; tongue is dry and breath foul; Kernig's sign slight; slight rotatory and horizontal nystagmus to right (sound side); left ear quite deaf. The movements of the head are free; cerebro-spinal fluid clear, but under pressure; films show Gram-negative bacilli and Gram-positive streptococci in cerebro-spinal fluid. January 19: Temperature, 96° ; no headache, but pain in abdomen; child is drowsy, with occasional restless attacks; diarrhoea. Digitalis and strychnine given with stimulants; paralysis of left eye; coma; death at 6 p.m. *Post-mortem*.—Cloudy swelling of liver, kidneys, etc. Enteritis; petechial hæmorrhages in lungs. *Ear*.—Labyrinthitis and peri-labyrinthitis; cholesteatoma in middle ear.

(d) *Chronic Suppurative Otitis Media, Cholesteatoma, Labyrinthitis, and Cerebellar Abscess*.—Male, aged seventeen, admitted September 5, 1911. History of discharge from right ear since measles in childhood. On September 2 discharge suddenly ceased, and pain in right ear commenced. September 3: Swelling behind ear, and sudden attack of giddiness. *Examination* (September 6): Right ear displaced; tempera-

ture, 100.4° F.; pulse, 100; sagging of posterior wall of meatus; no functional examination. September 7: Radical mastoid operation; subperiosteal abscess opened. October 11: Patient discharged. October 28: Patient readmitted. Face pale; temperature 96° F.; pulse, 68. *Examination*: Tongue protruded only after several requests in a loud voice; questions not answered; pupils equal and dilated; do not react to light; patient occasionally draws up legs and turns on right side; breathing almost stertorous; no photophobia; deep reflexes present; water passed in bed; right meatus full of pus. One hour after admission patient suddenly became flushed and perspired profusely; pupils became contracted; respiration gradually stopped; the pulse was 140, but fairly strong. Artificial respiration carried out, but pulse rapidly became feeble, and, in spite of stimulants, patient died at 11.40 a.m. *Post-mortem*: 1 p.m. on the same day; abscess in right lobe of cerebellum. *Ear*: Labyrinthitis and peri-labyrinthitis.

(e) *Results of Chronic Middle-ear Suppuration* (chronic adhesive process): D. M. C.—; no history obtained, and no functional examination. The left tympanic membrane (*post-mortem*) showed a large retracted kidney-shaped scar adherent to the inner wall of the tympanum. *Ear*: Adhesive processes in middle ear.

(f) *Chronic Adhesive Process in Middle Ear*.—Female, aged thirteen, suffered from chronic suppurative otitis media in infancy; left ear still discharging; right tympanic membrane shows a retracted scar in the posterior half adherent to the long process of the incus, and a chalk patch in the anterior part. Functional examination showed middle-ear deafness on the right side. *Right middle ear*: Adhesive processes.

(g) *Tubercular Disease of Middle and Inner Ear*.—Male, aged nine months (breast-fed). Nasal catarrh and obstruction since birth; quiet onset of discharge from left ear ten weeks before admission; swelling behind left ear for eight weeks; Wilde's incision by child's doctor before admission. *Examination*.—Marked adenoids; large perforation left membrane; right ear also discharging; no sign of pulmonary tuberculosis. Removal of adenoids; child continues to vomit after meals. *Radical mastoid operation*.—Much granulation-tissue present. After operation child continued to vomit, and head-retraction developed; meningitic cry; internal strabismus (left eye); no optic neuritis or tubercle of choroid. Cerebro-spinal fluid shows increase in mononuclear cells. Death. *Post-mortem*.—Tubercular meningitis and general tuberculosis. *Left middle and inner ear*.—Tubercular disease.

(h) *Tubercular Disease of Middle and Inner Ear*.—Male, aged nine months (a twin); had epileptic fits at age of six weeks; two weeks later right ear began to discharge; fits continued. At three months right ear operated on at another hospital, but discharge has continued. *Examination* (August 3, 1910).—Child much wasted; mouth shows thrush; frequent vomiting; profuse nasal discharge (*Staphylococcus aureus*, diphtheroid bacilli and diplococci). Child's head sweats profusely, and is markedly retracted; photophobia present; periotic glands enlarged; fistula behind right ear; facial paralysis on right side. *Operation* (August 4).—Large flat sequestrum removed from roof of middle ear, exposing dura with granulations on it. Sequestrum also removed from floor of middle ear and from inner wall, opening up canals, vestibule, and cochlea. August 5 to 16: Progressive emaciation and glandular enlargement; wound cavity very dirty, and shows few granulations. Death took place on the 17th. *Post-mortem*.—Membranes of brain injected; increase of cerebro-spinal fluid; tubercular nodule in right

anterior corpus quadrigeminum and another in occipital region. *Right middle and inner ear.*—Results of tubercular disease.

(i) *Tumour involving Auditory Nerve.*—Female, aged twenty-five; was mentally dull and bed-ridden for many months before death; face very expressionless; patient was blind, and had double optic neuritis. Death from coma. *Post-mortem.*—The outer or cranial surface of the dura, over almost its entire extent, was covered with small pedunculated tumours about the size of canary seed. On removal of the dura the inner surface of the cranial bones appeared as if deeply marked by smallpox. In the region of the right internal auditory meatus and cerebello-pontine angle there was a tumour mass about the size of a walnut which pressed the pons, medulla, and cerebellum towards the left side. Right ear demonstrated.

(j) *Cerebello-pontine Angle Tumour.*—Female, aged seventy-five. Complained of giddiness and deafness of five years' duration, also of noises in left ear. Patient could not walk without assistance; almost complete deafness; well-marked arteriosclerosis. *Functional examination.*—C32 and C64 not heard by either ear. C128-C1024 heard faintly by right ear but not by left. C2048 not heard by either ear. Schwabach shortened markedly. Galton whistle not heard. During her stay in hospital giddiness improved for a time, but got worse again. One year later headache developed and deafness became complete. Before death right arm, leg, and face became paralysed. *Post-mortem.*—Tumour of eighth nerve on right side eroding internal meatus. (Subsequent microscopic examination of left ear showed spontaneous cure of labyrinthitis, but this was not demonstrated). Right ear and tumour demonstrated.

(To be continued.)

Abstracts.

PHARYNX.

Capps, Joseph A. (Chicago).—**Epidemic Streptococcus Sore Throat.** "Journ. Amer. Med. Assoc.," September 16, 1913.

A review of the three epidemics in Boston, Baltimore, and Chicago, in which over 12,000 people were affected. In all three cities a peculiar type of hæmolytic capsulated streptococcus was secured from the throat cultures, or the peritoneal exudate of fatal cases, and the infection was traced definitely to a single milk supply. The source of the milk contamination was: (1) Streptococcus in the mixed milk at the collecting plant or farm; (2) mastitis in cows, from whose udders streptococcus is directly obtained; (3) streptococcus sore throat in the milkers; or (4) streptococcus sore throat in other employees who handle the milk. Pasteurisation is strongly advised as the most radical and simplest way of ending the malady.

Birkett (Rogers).

Levinstein, Oswald (Berlin).—**A Contribution to the Pathology of Diseases of the Mucous Membrane of the Mouth and Pharynx.** "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

The writer records a case of stomato-pharyngitis ulcerosa disseminata (Frese). The patient was a male, aged thirty-six, who had suffered from attacks of ulceration of the mouth for five years. The ulceration was

accompanied by burning pain and the healing process took a long time, during which other ulcers formed. The general health of the patient, however, remained good. On examination, Levinstein found a sharply cut ulcer on one anterior faucial pillar. The ulcer was about the size of a five-pfennig piece and had a greyish base and red edges; scars of old ulcers could be seen on the inner surface of the cheeks and on the soft palate. The patient's teeth were good and there was no fœtor of the breath. Treatment with peroxide of hydrogen, anæsthesin and phenol tablets. Three weeks later the ulcer had healed, but a similar one had appeared on the opposite anterior pillar. A smear from the ulcer showed bacilli and cocci, but no spirochætæ or fusiform organisms. The Wassermann reaction was negative. Microscopic sections of the ulcer showed that the epithelium was penetrated and the submucous tissue invaded. Levinstein states that stomato-pharyngitis ulcerosa disseminata must be distinguished from aphthous stomatitis, in which only the epithelium is affected; also from herpes, pemphigus, erythema exudativum multiforme, syphilis and tuberculosis. Herpes has a different clinical course: pemphigus, erythema multiforme and syphilis are all accompanied by skin eruptions. Levinstein treated his patient with gargles containing peroxide of hydrogen and insufflations of anæsthesin. Calcium chloride was administered internally.

In the same paper Levinstein records a case of eczema of the cheeks and pharynx in a patient who suffered from chronic eczema of the skin. For three years the patient had suffered from pain in the mouth associated with the formation of red spots and small ulcers which became covered with a false membrane. The author states that erythema multiforme (for which eczema of the mouth may be mistaken) is more acute and accompanied by more intense hyperæmia. *J. S. Fraser.*

NOSE.

Hill, Leonard, and Muecke, Francis F.—Colds in the Head. "Lancet," May 10, 1913.

An investigation into the influence of warm confined atmospheres on the mucous membrane of the nose and throat. The mucosa becomes turgid with blood and tissue lymph and covered with thick secretion, airway being narrowed, especially if the septum is deflected. On passing into a cold atmosphere, the mucosa pales, but remains swollen with tissue lymph. This process seems likely to increase liability to infection. The authors believe that colds are due to the massive direct transmission of bacteria in warmed confined atmospheres, followed by exposure to cold, moist outer air. The danger is diminished by keeping the air moving. The authors also find that convection heat flushes and swells the nasal mucous membrane, whilst radiant heat causes sweating of the skin and does not affect the nose. *Macleod Yearsley.*

Ingersoll, J. M.—The Morphologic Changes in the Nose and Face due to the Development of the Brain. "Annals of Otology, etc.," xxi, p. 557.

A concise paper, describing the brain and nose in fishes, amphibians, reptiles, birds, and mammals. The tremendous development of the human brain carries it forward so that it extends over the nasal cavity and changes the facial angle. The nose, instead of being anterior to the brain, lies almost directly under it, and the cribriform plate forms the

roof of the nose in man, whereas in most other vertebrate it forms the posterior boundary. The olfactory organ in apes, and especially in man, is a decidedly degenerated structure. The author might have extended his paper a little to demonstrate the result of these changes upon the growth of the septum nasi and their possible influence upon the formation of deviations.

Macleod Yearsley.

LARYNX.

Cisler, Prof. (Prague).—Disturbances of the Voice and Articulation, caused by Atropine Poisoning. "Zeitschr. f. Laryngol.," Bd. vi, Heft 3.

The author states that the dryness of the throat caused by atropine is due to paralysis of the endings of the peripheral secretory nerves. Atropine also produces dilatation of the pupil, burning feeling and thirst, difficulty in swallowing, hoarseness, and a tendency to vomit. Later there is aphonia and aphagia—the attempt to drink water brings on cramp of the swallowing muscles. Finally headache, giddiness, dulness of sensibility, hallucinations and loss of consciousness supervene. The cramp of the adductor muscles of the larynx is due to the fact that in the cerebral cortex the adductor centres dominate the abductor centres; this, of course, is the opposite of the conditions which obtain in the medulla. The writer comes to the conclusion that the disturbances of voice and articulation caused by atropine poisoning are due not only to the dryness of the mucous membrane, but also to cramp of the muscles which close the glottis.

J. S. Fraser.

Packard, F. R.—Carcinoma of the Larynx removed by Thyrotomy. "Annals of Otology, etc.," xxi, p. 408.

Male, aged fifty. Symptoms of a year's duration: choking, husky voice, and dry cough. No pain. Microscopical examination of a removed portion showed it to be carcinoma. Thyrotomy, after tracheotomy. Growth enucleated and found to be attached on right side of inner surface of thyroid cartilage. Size of a very large walnut. Operation on February 18, 1911; no recurrence, May 2, 1912.

Macleod Yearsley.

EAR.

Lewin, Leo. (St. Petersburg).—Concerning Congenital Atresia of the External Meatus with Microtia and their Surgical Treatment. "Monats. f. Ohrenheilk.," Year 47, No. 7.

A summary of the views and experience of various authors on this anomaly introduces the story of a girl, aged fifteen, whose hearing her elder sister implored Lewin to improve.

On both sides the auricle was rudimentary and no trace of a meatus was to be discovered. Soft palate normal in form and movement. The openings of the Eustachian tubes could be seen on posterior rhinoscopy; that on the right was normal but on the left side it was obviously underdeveloped. Inflation was fairly easy but was accompanied by an undoubtedly greater noise on the right side. The bougie passed 30 mm. on the right side but only 16 mm. on the left, and that with difficulty.

Functional Tests.

Right.		Left.
Ad. conch.	×	Ad. conch.
Not heard	.	Not heard.
1.5	.	1.0.
Not heard	.	Not heard.
Shortened	.	Shortened.
Normal	.	Normal.
Neg.	.	Neg.
	.	>
Lengthened	.	Lengthened.

Vestibular apparatus completely normal.

An X-ray picture was taken with a catheter and metal sound passed into the tubes, demonstrating the fact that no tympanic cavity probably existed (a good print of this accompanies the text, though unfortunately inverted by mistake). This, however, Lewin did not accept as absolute proof, and after careful consideration of the whole question determined to operate on the better (right) ear. Great difficulty was experienced in deciding the situation of the antrum as no landmarks appeared on reflection of the skin, and the site for approach had to be located from the relation of the proc. zygomatic. After some careful excavation a minute antrum was discovered, "the size of a pea," lined with normal mucous membrane. The eminence corresponding to the external horizontal canal and the aditus could also be demonstrated, but no tympanic cavity or ossicles could be found. This, therefore, brought the operation to an end and the wound was closed.

The subsequent result to the functional tests showed much improvement, and the range for conversation was now doubled, viz. 3 metres. Lewin summarises his advice as follows:

(1) The inner ear must be proved to be intact in order to expect any improvement in hearing from operative procedures on cases of congenital atresia of the outer meatus.

(2) If in such cases in addition the middle ear is deformed a slight improvement in hearing may obtain should one be successful in constructing a route up to the labyrinth wall.

(3) Operative treatment of cases of atresia where the tympanic cavity is normal affords a far better measure of success.

(4) The cosmetic result of operation is most satisfactory, as an opening is established in the usual position. *Alex. R. Tweedie.*

REVIEW.

Diseases of the Nose, Throat and Ear. By FRANCIS R. PACKARD, M.D.
Second edition. Pp. xvi + 377. Illustrated. Philadelphia and
London: J. B. Lippincott Company. Price 15s. net.

This work has run through a first edition in a relatively short space of time. The general arrangement, some excellent illustrations, as well as the printing, are worthy of praise, though we feel that several of the illustrations are unlikely to serve a useful purpose, *e.g.* a figure showing eleven instruments set out as instruments for a "tonsillotomy."

In some cases the information afforded is lamentably deficient; for instance, the whole chapter on laryngeal neuroses occupies but three pages, in fact we can best illustrate the limitations of the text-book by citing at length (except for the sixteen lines on treatment) the entire section on

"Abductor Paralysis," viz.: "This may be unilateral or bilateral. Bilateral paralysis is a rare but extremely serious condition, and its most prominent symptom, of course, is dyspnoea, which may go on to suffocation and cause the death of the patient. Bosworth thinks that the great majority of cases are due to lesions in the medulla oblongata, but there have been a number of cases reported which seem to have been the result of an infectious neuritis occurring as a sequel in 'typhoid fever' or other infectious diseases. Unilateral abductor paralysis is, of course, not nearly so serious a condition, the dyspnoea never assumes as grave a character, and the patient may live with it for many years, suffering no further inconvenience than partial aphonia." Nothing else is mentioned in connection with abductor paralysis. Apparently the proclivity of the abductors to succumb in progressive lesions earlier than the adductors is, like the name "Semon," considered of too little import for the practitioner. On the pathology of ethmoiditis, the author states that "chronic ethmoiditis is usually associated with caries or necrosis of the bony walls of the cells"! In otosclerosis the author states that Gellé's test is sometimes of value. "It is performed by placing the tuning-fork upon the vertex, when, if there is increased labyrinthine pressure, its tone will be greatly diminished in the affected ear. Of course such a test only shows the presence of increased labyrinthine pressure, and, as this, may be due to other causes than otosclerosis," etc.! This is the only reference to Gellé's test we could find. Careful revision of the text and the rewriting of various pages is required before we can commend the work as a guide to students and practitioners.

P. Watson-Williams.

NOTES AND QUERIES.

Mr. Arthur Cheatle has been elected an honorary member of the Società Italiana di Laringologia e Otologia.

At a meeting of the Berlin Laryngologische Gesellschaft on January 16, Sir StClair Thomson and Dr. Dundas Grant were elected Honorary Members, and Drs. Tilley, Logan Turner and Brown-Kelly were elected Corresponding Members.

DEVON AND CORNWALL EAR AND THROAT HOSPITAL, PLYMOUTH.

Mr. George Jackson, who has been Honorary Surgeon to the hospital since its foundation twenty-seven years ago, has resigned from the active staff, and has been appointed Honorary Consulting Surgeon.

Mr. Charles W. M. Hope has been appointed Assistant Surgeon to the Throat Department in King's College Hospital, London.

THE USE OF ADRENALIN IN TREATMENT BY SALVARSAN.

In the *British Medical Journal*, January 24, 1914, p. 212, attention is drawn in an editorial to a paper by Milian, in which the intramuscular injection of 1 to 2 c.cm. of a 1-1000 solution of adrenalin a few minutes before the salvarsan injection is recommended as a reliable method of counteracting the depression and other toxic phenomena of the arsenical compound. "Adrenalin tremble" follows the administration of that substance, but it is generally abolished by the salvarsan. It would appear that, in certain respects, salvarsan and adrenalin are physiological antagonists.

BOOK RECEIVED.

Transactions of the Thirty-fifth Annual Meeting of the American Laryngological Association, May, 1913. Published by the Association. New York: 1913.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

THE INTRA-NASAL TREATMENT OF LACHRYMAL DISEASE.

By D. R. PATERSON, M.D., M.R.C.P.,

Surgeon to the Ear and Throat Department, King Edward VII Hospital,
Cardiff.

THE treatment of lachrymal affections has ever formed one of the most unsatisfactory chapters in medicine. Situated as the tear passage is on the frontier line of two special regions, while the rhinologist could afford to ignore and did ignore it, the ophthalmologist had perforce to give it his attention, and it has been not inaptly called the step-child of ophthalmology. Though the conception of attacking lachrymal trouble by draining the passage into the nose is a very old one, having been known to the ancient Greeks and Egyptians, yet practically nothing had ever been done to carry it out. During the last twenty years the unsatisfactory state of the question prompted efforts to solve the problem. While ophthalmologists fell back upon an old method, viz. excision of the sac, it was only when a proposal to combine it with intra-nasal opening for drainage was made that the interest of rhinologists was really awakened. They began to attack the question from the nasal side. An increased knowledge of lachrymal disease and its mode of origin made more clear to them the nature of the problem, and so great has the recent advance been, that it may be said that its solution is well in view.

ANATOMY.

The lachrymal apparatus concerned with the removal of the

tears consists of the canaliculi, upper and lower, the lachrymal or tear sac, the lachrymal or tear duct and its outlet. Both canaliculi generally unite and open into the tear sac. This sac lies in the lachrymal fossa or groove (Figs. 1 and 2), the anterior half of which is formed by the ascending process of the superior maxilla with the crista lachrymalis anterior, the posterior half by the lachrymal bone with the crista posterior. These two halves are of unequal thickness, the former being thick compact bone, the latter usually thin

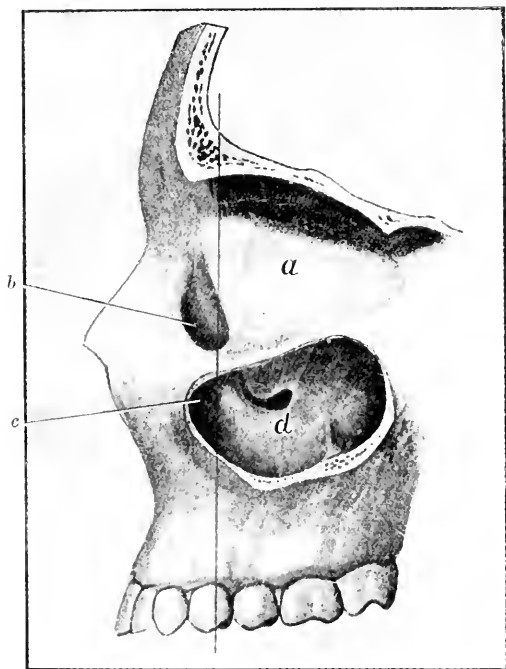


FIG. 1.—Sections showing relations of lachrymal fossa and naso-lachrymal duct (after Fein). *a*. Orbit. *b*. Lachrymal fossa or groove. *c*. Bulging of lachrymal duct. *d*. Antrum.

and sieve-like. The groove lodges the tear sac, which intimately blends with its thin periosteum. On its inner aspect the groove is covered by mucous membrane of the middle nasal fossa and is accessible from that side. On its outer aspect the tear sac has no bony covering and is in relation to the structures about the inner canthus; hence it is possible to compress it from the outside—a point of practical importance in the intra-nasal operation. The sac passes below into the membranous tear duct, which is sheltered in the naso-lachrymal canal and terminates in an outlet in the inferior

meatus. The bony outlet is found on the roof of the meatus at its highest point, about the junction of the anterior two fourths of the line of insertion of the turbinate. The bony and membranous outlets do not always correspond. If they do, the opening is wide with a clearly defined edge; usually, however, the membranous canal stretches beyond the bony, running under the mucosa to open lower down, often in a slit, but sometimes ending blindly with a lateral slit as the outlet. This disposition renders it liable to blocking by certain conditions of the nasal mucous tract and by pressure from growths, etc., in the nasal cavity.

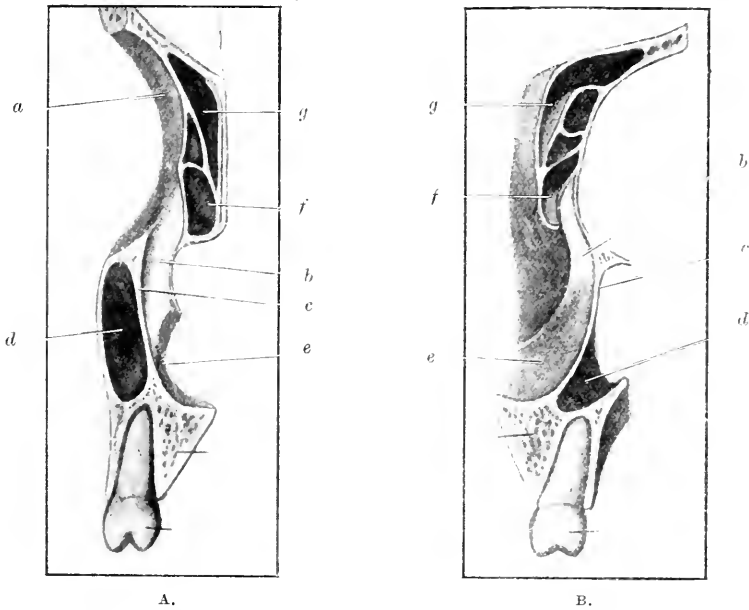


FIG. 2.—Frontal section of preparation in Fig. 1 through plane of perpendicular line. A. Anterior segment. B. Posterior segment (after Fein).
a. Orbit. *b.* Lachrymal fossa or groove. *c.* Bulging of lachrymal duct.
d. Antrum. *e.* Inferior meatus. *f.* Ethmoidal cell. *g.* Frontal sinus.

The passage from the top of the sac to the outlet comes into close relation with the nasal cavity. Its bony framework formed by the lachrymal, superior maxilla and inferior turbinate bones may be readily made out. The anterior half of the lachrymal groove formed by the thick ascending process of the upper jaw may be identified as a prominence—torus lachrymalis—in front of the anterior end of the insertion of the middle turbinate, and is a valuable guide to operation. Ethmoid cells, such as the frontal and anterior ethmoidal, may abut on the median aspect of the lachrymal

fossa (Fig. 2*f*), the thin bony wall which separates the two cavities often showing dehiscences which readily allow of the passage of disease from cells to sac. The infundibulum of the frontal sinus occasionally comes so far down as to lie close to the sac, whilst the maxillary antrum has a relation to the tear duct. But it is the close proximity of the ethmoid to the tear sac which explains the frequency of the connection between lachrymal and nasal disease. In addition we have close communication between the venous and

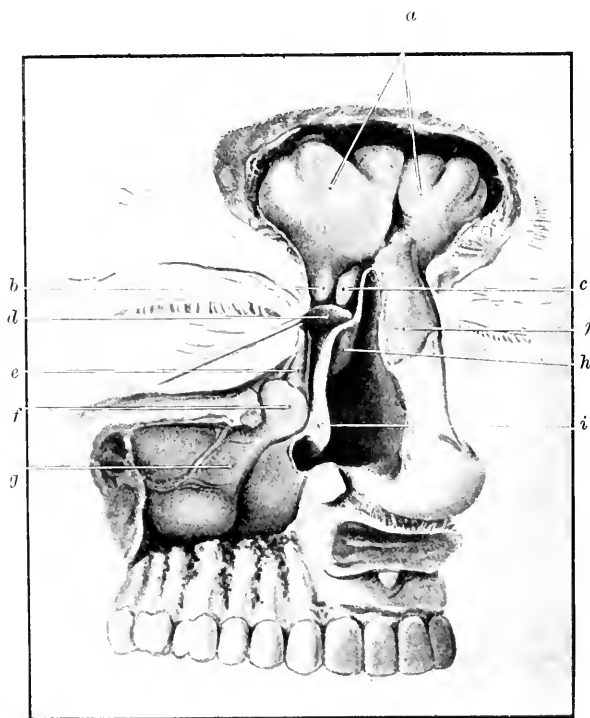


FIG. 3.—Dissection showing parts about lachrymal sac and duct (after Killian). *a*. Frontal sinuses. *b*. Infundibulum of frontal sinus. *c* and *d*. Ethmoidal cells. *e*. Naso-lachrymal duct. *f*. Prelachrymal recess of antrum. *g*. Antrum. *h*. Middle turbinate. *i*. Inferior turbinate. *j*. Nasal bone.

lymph tracts of the two regions. Fig. 3 shows the infundibulum coming close to the sac and an ethmoidal cell overlapping it.

LACHRYMAL AFFECTIONS AND NASAL DISEASE.

Affections of the tear passages from nasal causes range from simple epiphora to severe phlegmonous dacryocystitis. The nasal conditions producing them may be grouped together mainly under three heads:

(1) *Those Interfering by Pressure on the Outlet of the Duct.*—In this group, which has long been recognised by rhinologists, are conditions which impede either by their size or structure the outflow of tears into the nose. The removal of hypertrophied turbinates, polypi, cysts, deviations and spurs in the septum often relieves epiphora. On the other hand, as the membranous tear duct frequently runs under the mucosa and opens at some distance from the bony outlet, it may be affected in its course by circumscribed changes in the mucous membrane leading to hindrance of the outflow.

(2) *Inflammatory Affections of the Nose which extend by Continuity or by Contiguity to the Lachrymal Passage.*—Atrophic rhinitis may lead to purulent affection of the sac, chiefly by direct extension through the duct. Ethmoidal disease is a frequent cause of dacryocystitis from direct extension through the lachrymal bone to the sac. It is important to note that the ethmoidal disease may not always be obvious. It may be latent, as in two of my own cases, where it was only at the operation that suppuration of ethmoidal cells overlapping the bony wall of the sac revealed the cause of the dacryocystitis.

(3) *Specific Processes Spreading from the Nose up the Duct, e.g. Tubercle and Lupus.*

Kuhnt says—"Of by far the greatest practical importance are the evil results to the eye which follow the spread of inflammatory nasal conditions to the lachrymal passages and thence to the conjunctiva and cornea. The number of eyes lost in this way largely out-number, in my experience, all other forms of blindness from nasal disease." According to his statistics founded on experience in private practice the affections of the tear passages are in 93.7 per cent. of the cases of nasal origin. Brückner agrees with the view that in lachrymal disease there is nearly always some trouble in the nose as the causal condition. Rhese further confirms this, and sums up his views—"In my experience, disease of the anterior ethmoidal cells plays a prominent part in the genesis of tear-sac suppuration. I have operated on thirty such cases with excellent result, and it is the same in many cases of stenosis and epiphora."

Whatever the cause of the obstruction may be it leads to stagnation of secretion in the duct and sac, sometimes to great distension of the latter, and upon this may be grafted infections of various kinds. In lesser degree disease of an ethmoid cell contiguous to the sac may produce merely swelling of the mucosa of the latter and narrow its lumen where it passes into the duct. Consequently any operative procedure to be of service must deal

with the sac above this point, and it is a recognition of the fact that this is the most frequent site of stenosis which has led to the recent advance in intra-nasal treatment.

TREATMENT OF LACHRYMAL AFFECTIONS.

The methods of dealing with lachrymal affections may be divided into external and internal.

The external methods have been employed chiefly by ophthalmologists and most of them have but little interest for rhinologists. Slitting the canaliculus and passing Bowman's probes is a procedure much in use. "Dilatation by probing is the ordinary and best treatment for all strictures" (Nettleship). On this point some remarks of Kubut may be quoted: "A superficial examination of a large number of skulls will show that the lachrymal duct is only exceptionally straight; usually it curves somewhat backwards laterally or forwards. If a rigid probe, such as Bowman's, is introduced, it must necessarily here and there displace or lacerate the hyperæmic and swollen mucosa. Traumatism results, and the subsequent reactionary inflammation increases the swelling already existing." Laying in a permanent style or probe had considerable vogue at one time. A late colleague of mine thought highly of it and treated a considerable number of cases in this way. Its success, however, was not always due to its maintaining the natural passage. Through the kindness of my colleagues, Mr. F. Cresswell and Mr. Russell Thomas, under whose care they afterwards came, I have had the opportunity lately of examining two of those cases where the method acted efficiently for six or seven years in removing the epiphora (Fig. 4). The style had in both passed through the lachrymal bone into the middle meatus and lay not in the duct but in the nasal cavity, thus establishing a communication between the sac and the nose as in intra-nasal dacryocystotomy. Goethe, in *Wahrheit und Dichtung*, describes an operation at which he was present when a student at Strassburg and which was performed on his friend, the celebrated Herder, for a lachrymal affection—the laying in of a horse-hair drain through the tear passage. He speaks of it as "eine schmerzliche, höchst verdriessliche und sunichere Operation (a painful, very irritating and uncertain procedure)," and it did not turn out a success. A modification of the method is still made use of.

In more severe cases extirpation of the sac by means of excision is practised by ophthalmologists; but even then "watering of the eye" has remained in a good many of the cases.

The external procedure of most interest and which marked an important advance is that devised by Toti, an Italian rhinologist, in 1904, to which he has given the name dacryocystorhinostomy. It is carried out by a curved incision around the inner canthus through the soft parts, detaching the periosteum from the lachrymal fossa and displacing it forwards and outwards with the enclosed tear sac. A wide communication with the nasal cavity is then made through the bony wall. The posterior wall of the sac is



FIG. 4.—Skiagram of style which had been passed through the sac wall into the middle meatus and lay in the nasal cavity. It relieved epiphora for some years.

excised and part of the nasal mucous membrane resected. The parts are then replaced. It is essentially an establishment of nasal drainage by external operation, and there is no doubt that it has had considerable influence in pointing the way to recent advances. In Toti's hands the results have been good, but the technique is somewhat difficult, especially where the ethmoid requires to be resected, and ophthalmologists who have given it a fair trial have achieved but moderate success. My colleague, Mr. Leighton Davies, has done it in ten cases with a successful result in seven, and

thinks well of it. It involves a good deal of disturbance of the relations of the sac, and is very difficult to carry out where there is external phlegmon. It fails to touch the intra-nasal disease which is often the cause of the trouble, and the nasal part of the operation may be difficult to carry out owing to the disposition of the parts. It leaves an external scar. It is to efforts to overcome its disadvantages that we owe the intra-nasal method.

Intra-nasal treatment.—It is this form of treatment which concerns rhinologists more directly. It had long been a matter of common experience to note a "watering eye" disappear after the removal from the nasal cavity of some object which pressed on the outlet of the duct, such as polypi, hypertrophies, spurs, cysts, etc.

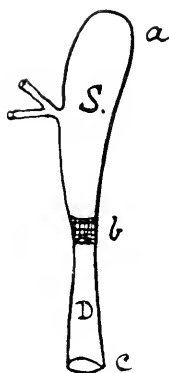


FIG. 5.—Diagram of lachrymal system to illustrate principle of operation.
s. Sac. d. Duct. a. b. Inner wall of sac which is excised in operation.
b. Common seat of stenosis. c. Outlet in nose.

Again, attempts had been made from time to time by retrograde probing to dilate the outlet of the naso-lachrymal duct, but they met with very little lasting result. The most fruitful procedures were those which aimed at opening the lachrymal duct and sac. For a long time those efforts were restricted to the duct where it is accessible from the inferior meatus. Caldwell, in 1893, in one case removed part of the lower turbinate and opened the duct and established drainage. Passow in 1901 carried out a more extensive operation. Removing part of the lower turbinate, he laid bare the whole membranous canal up to the tear sac, which he then slit open. He published three cases, but the procedure does not seem to have been generally adopted. J. M. West in 1910 cut a window in the naso-lachrymal duct just above the inferior turbinate, and published seven cases of which five were

cured. My own experience of this operation in two cases showed there was difficulty in preventing the window from closing.

The greatest advance was made about eighteen months ago, when West and Polyak, independently of each other, laid open the tear sac by making a window in the bony wall and established drainage by excising part of the sac wall. This operation, which has been called intra-nasal dacryocystotomy, is based on the view that the usual seat of dacryostenosis is at the outlet of the sac into the duct, and that any measure directed to the relief of it and its results must go above that point and attack the sac itself (Fig. 5). The seat of election has changed therefore from the duct, *b, c*, to the sac wall, *a, b*. It may be noted that Nature herself sometimes adopts this route for the tear outflow. Geddes records a congenital anomaly in which on one side the passage passed from a normally situated lachrymal sac downwards and inwards and terminated in the middle meatus. The naso-lachrymal duct on that side was represented by a fibrous cord in a normal bone canal which passed down to the roof of the inferior meatus.

INTRA-NASAL DACRYOCYSTOTOMY.

The operation may be carried out under local anæsthesia induced by applying cocaine and adrenalin to the region around and in front of the anterior end of the middle turbinate. Some idea of the position of the sac on its nasal side may be obtained by laying a probe outside on the cheek with its point over the inner canthus, measuring its distance from the nasal entrance and taking this for the inside measurement. As a rule the site of the sac is just in front of the anterior point of attachment of the middle turbinate (Fig. 6). Its prominence, forming the torus lachrymalis, is often visible. The turbinate, however, may come further forward and overlap it and part of this may require to be resected before coming down on the sac wall. The operation as carried out by West is begun by turning down a quadrilateral flap of mucous membrane, *a, b, c, d*, in front of the prominence over the sac for the purpose of obtaining more room to work. This flap is made by incisions down to the bone on three sides by means of a long slender knife, the anterior corresponding to the apertura pyriformis, the posterior immediately in front of the torus, the superior joining the upper extremities of both. The flap is now turned down and left attached by its base below; in a wide nostril it is usually unnecessary. Just behind it over the torus the mucous membrane is removed exposing the bony wall of the sac (*s*). By means of a long hollow chisel slightly

curved back (Fig. 7c) the anterior half of the fossa lachrymalis formed by the thick ascending process of the superior maxilla is chiselled away, the thinner lachrymal bone behind being removed by a slender bone forceps or fine conchotome. The sac wall being fully exposed, it is possible by pressure on the sac externally over the inner canthus to make it bulge internally, and a probe touching the wall of the sac internally may be controlled from the outside in the same manner. The inner sac wall is now seized with a fine-toothed forceps (Fig. 8), pulled inwards, and part of it excised by a long, thin, straight bistoury. By this

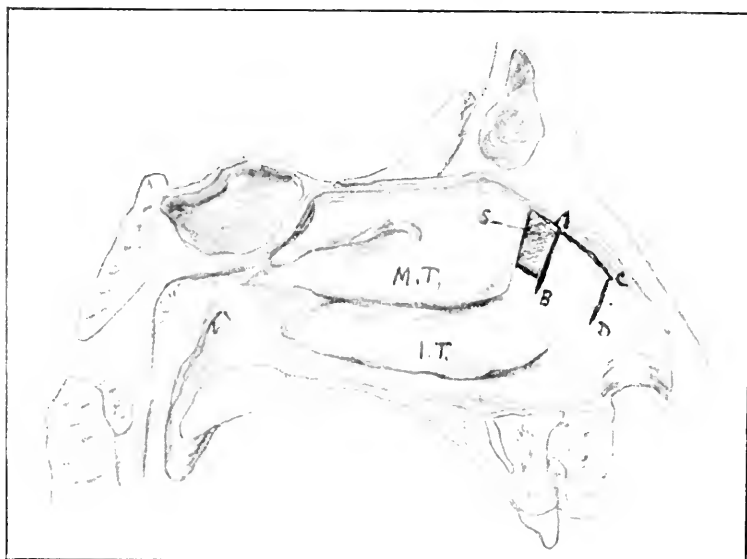


FIG. 6.—Operation as done by West. A, B, C, D. Mucous flap which is temporarily turned down. s. Sac exposed by removal of mucous membrane and bone. M.T. Middle turbinate. I.T. Lower turbinate.

means a large window is established and the contents of the sac flow out. A bent probe will now determine the relations of the sac, and by means of a fine-pointed lachrymal syringe inserted through the punctum, its cavity may be washed out. The mucous flap is now released, replaced in position and retained there by a little packing. Polyak's procedure differs but little from this. He dispenses with a flap, and after removing the mucosa he makes a transverse cut at the point where the sac joins the duct, inserts a curved probe to determine how far the sac extends, and if all the bony wall has been removed the sac wall is excised by means of a suitable conchotome. He avoids slitting the canaliculus and passing

a style into the duct. Where the parts are easily accessible West makes the bony window a little larger than the opening in the mucosa, and folds the latter over the edge of the bone so as to prevent the formation of granulation. In some cases the anterior end of the middle turbinate may come far forward and overlap the sac and has to be removed as a preliminary. Not infrequently a frontal or ethmoidal cell covers the sac and has to be opened up and removed. What looks like a prominent sac wall and promises an

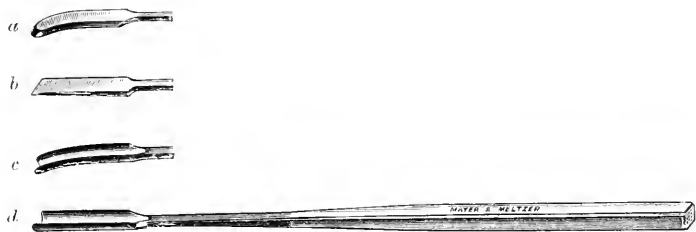


FIG. 7.—*a*. Elevator for muco-periosteal flap. *b, c, d*. Chisels of different shape.

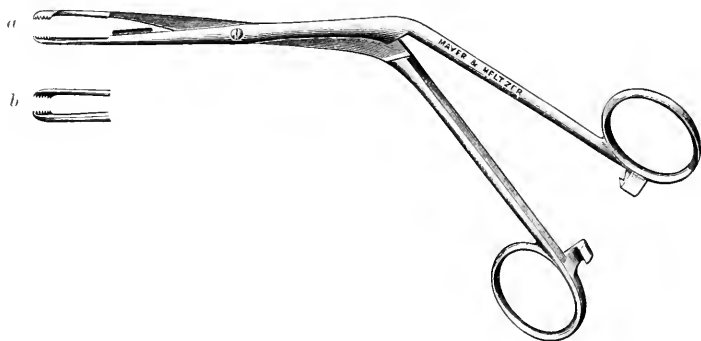


FIG. 8.—Fine-toothed forceps. *a*. For right side. *b*. For left side.

easy operation often turns out to be such a cell. Breaking into it, however, does not complicate matters as a rule; on the contrary it may enable one to get at the thin wall of the lachrymal bone and remove it more easily. Bleeding may prove disturbing for a time when part of the turbinate has to be cut away, and it is not desirable to remove more bone than is necessary on that account. By this operation only the tear sac is opened; the duct remains untouched, as it is above that part of the canal where the stenosis generally lies. The after-treatment is very simple, being confined to syringing through the canaliculus with warm lotion.

The advantages of this operation according to West are: (1) The

physiological function of the tear passage is re-established, so that not only suppuration of the sac and phlegmon rapidly subside and fistulae close up, but the tears can flow into the nose as formerly ; (2) probes and styles are avoided ; (3) the tear glands are preserved ; (4) external incision and curetting with the resulting scar are avoided.

It is indicated in all troubles which are produced by dacryostenosis, viz. dacryocystitis, blennorrhœa, fistula, phlegmon and epiphora. It is contra-indicated in very young children, very old people, and generally where the nasal entrance is contracted by cicatricial tissue.

Available statistics afford reasonable ground for anticipating a good future for the operation. West has performed it in 130 cases,¹ including cases of epiphora, dacryocystitis, dilatation of the sac, blennorrhœa, phlegmon and fistula. In 90 per cent. spontaneous lachrymal flow was established. Polyak performed it in forty-two cases with immediate success in thirty-five. With the establishment of nasal drainage infective agents disappear out of the conjunctival sac, and in a case operated upon by West, Silex was able to perform a cataract operation without untoward result.

From my own experience the operation is not difficult to carry out. It is perhaps most troublesome in a nasal cavity which is splayed in its anterior part, that is, where the ascending process of the superior maxilla is, as it were, rotated on its long axis so that its posterior surface lies more laterally, a condition which makes it more difficult to get at the lachrymal fossa and necessitates the greater use of the chisel with consequent oozing. In several of my cases deflection of the septum in its upper part interfered with the working space, and a limited submucous resection was done to give the necessary room. On the other hand, on the concave side of the septum the operation was done without resorting to a preliminary flap. In one case the deflected septum came into such close apposition with the turbinate that it was impossible to do anything until part of the septum was resected. Such a case illustrates a difficulty in draining the sac by Toti's method as the proximity of the parts would inevitably lead to adhesions and closure of the opening. Where there is curving in of the apertura pyriformis contracting the nasal entrance a portion of the bone can be resected to give more room.

These additional procedures, though they may prolong the operation, complicate it but very little. They are part of the routine of a rhinologist and are easily carried out.

¹ This number now exceeds 200.

The relief given by the operation is immediate, and in striking contrast to the long-drawn-out treatment by style and probe. For epiphora due to hypersecretion or disturbance of the innervation of the lachrymal glands, as in Graves's disease, facial palsy, etc., or produced by an affection of the puncta or of the canaliculi the operation can have no value. But in all cases of dacryostenosis it is suitable where an operative procedure is indicated, and there is reason to hope it may become the normal method for the treatment of a large group of lachrymal affections.

REFERENCES.

- KUHNT.—*Ueber die Beziehungen zwischen Nasen- und Augenleiden. Verhandl. des Internat. Rhino-laryng. Congress in Wien, 1909*, p. 111.
 BRÜCKNER, A.—*Nase und Auge in ihren wechselseitigen patholog. Beziehungen*, p. 30.
 RHESE.—*Verhandl. d. Vereins deutsch. Laryngol.*, 1913, p. 210.
 TOTI, A.—*La Clinica Moderna*, No. 33, 1904.
 GEDDES, A. C.—*Anat. Anzeig.*, Heft 37, 1910.
 WEST, J. M.—*Archiv. f. Laryngol.*, Bd. xxvii, Heft 3.
 POLYAK, L.—*Ibid.*, Bd. xxvii, Heft 3.

NOTE ON THE HISTOLOGY OF ENUCLEATED TONSILS.

By WYATT WINGRAVE, M.D.,

Pathologist Central London Throat and Ear Hospital and the Polyclinic.

EXAMINATION of tonsils removed by guillotine (*i. e.* partial removal), by *écraseur* and enucleation respectively, present very striking differences in structure, which cannot be accounted for by age, variation, or by morbid changes.

The most prominent feature in enucleated specimens is the large amount of skeletal muscle which is seen in its attached area or bed (Fig. 1). This is not seen in tonsils removed by guillotine, and only slightly in *écraseur* specimens. Such occurrence of muscle-fibres is limited to a small but variable area, and it is so constant that it must be accepted as a normal condition which has to be seriously considered in tonsil removal.

A brief review of the tonsil's attachment will explain the presence of these fibres and their significance.

The faucial tonsil rests in a somewhat irregular pocket formed by the upward union of the faucial pillars as they invest the supratonsillar fossa. Below, it is separated from the lingual tonsil by a space containing a variable number of mucous glands. The anterior or palato-glossal pillar is a representative of the second branchial arch and contains a vestigial artery, but no muscle.

The posterior pillar is often less clearly defined and formed

by a fold of mucous membrane over the edge of the palatopharyngeus muscle. The tonsil is loosely attached to these pillars



FIG. 1 is a section through the bed or attached portion of the tonsil. Bundles of skeletal muscle-fibres are seen in transverse section embedded in the lymphoid tissue of the tonsil.

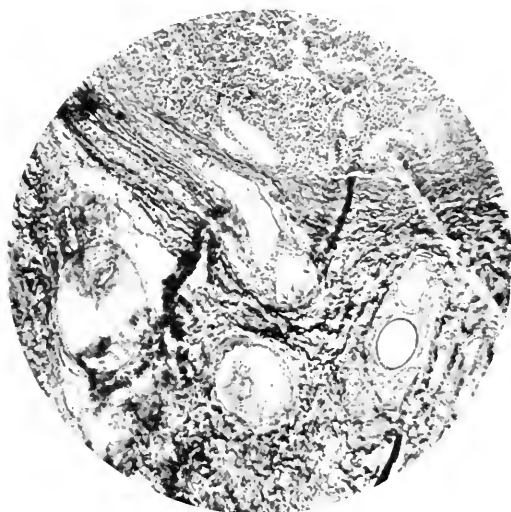


FIG. 2 is stained specially to show elastic fibres. It is taken somewhat deeper in the tonsil at a point from which the connective-tissue septa radiate. Elastin fibres are black (orcein).

by a thin layer of white fibrous tissue containing elastic fibres—the so-called capsule. But it is intimately and closely secured at its outer aspect by a bed or base of variable size and extent. This

area consists of skeletal muscle-fibres (Fig. 1) directly continuous with the pharyngeal constrictors, which can be traced for a short but variable distance into the substance of the tonsil, carrying with them blood-vessels and a striking amount of elastic tissue.

These elastic fibres divide into two distinct sets. One passes with the muscle-fibres and vessels into the small attached portion of the tonsil and radiate into the septa (Fig. 2), where they gradually diminish towards the surface, a few only being traceable with the blood-vessels. The other set passes along the buried surface of the tonsil forming a definite band seen in Fig. 3, which in young subjects persists underneath the stratified epithelium of the exposed

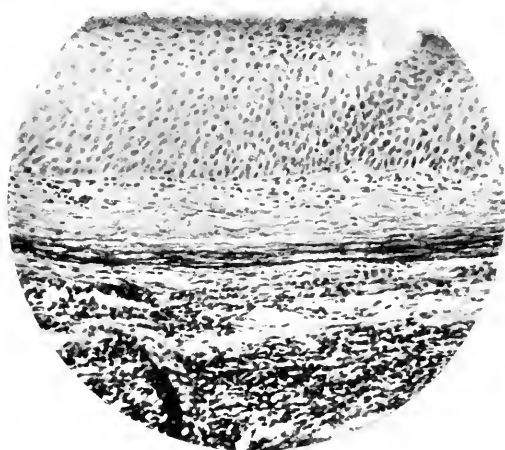


FIG. 3 shows the elastin fibres as a well-defined band beneath the stratified surface epithelium, which can be traced as an independent layer over nearly the whole surface of the tonsil. Elastin fibres black.

surface. They thus constitute an integral and important part of the capsule, but both kinds are fewer in adult specimens and almost absent in all tonsils which have been sufficiently large and prominent to demand removal. In such cases the elastin fibres can rarely be traced beyond the buried parts, *i. e.*, further than the edge of the pillars.

It is suggested that they may play an important part in retaining the tonsil in position.

In many hundreds of tonsils removed by guillotine, muscle-fibres were never seen, their discovery being first made in fragments which were enucleated. Subsequent search has proved their existence in all enucleated specimens. In the "buried" part of

the tonsil evidence of a defined capsule was wanting, the only structures being a loose arrangement of white or colloid fibres mingled with elastic elements and vessels, the exposed surface alone being covered with many layers of stratified epithelium which justified the term "capsule."

In Pappenheim-stained sections plasma or pyronin cells were very numerous when inflammatory changes had taken place, but in simple uniform enlargement without any evidence of inflammation and with perfectly symmetrical grouping of the lacunæ, lymph-nodules and lymph-pulp, there were few or none. The chronic tuberculous tonsil with giant-cells was particularly rich in plasma-cells. These are of two kinds—"red" or recent and "copper"-coloured or old ones (clasmatocytes). Both indicate a chronic inflammatory process.

"Hyaline" bodies historically associated with malignancy (Russell's corpuscle, fuchsin bodies, etc.) are often found in old chronically inflamed specimens.

Conclusion.—There is an intimate connection between the tonsil and the muscular bed on which it rests.

The muscle-fibres are not sharply separated from the tonsil by aponeurotic tissue, but extend into the tonsil.

The muscular extension is usually avoided in partial removal by guillotine, but is disturbed during enucleation.

Exposure of these muscle-bundles affords a ready channel for infection of the deep cellular spaces.

Elastic tissue is a prominent element in young and normal tonsils, but is deficient or absent in mid-life and in diseased tonsils.

REPORTS FOR THE YEAR 1913 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART III.

IMMEDIATE AND REMOTE EFFECTS OF OPERATIONS ON THE TONSIL.

BY J. K. MILNE DICKIE, M.D., F.R.C.S. EDIN.,

Formerly Senior Clinical Assistant in the Ear, Nose and Throat Department,
Royal Infirmary, Edinburgh.

DURING the last few years the operation of tonsillectomy has been gradually displacing the older operation of tonsillotomy. Much has been written concerning the merits and demerits of

tonsillectomy, and, with a view to satisfying myself upon several points in this connection, I have analysed a large amount of clinical material, the results of which are embodied in this paper. Through the kindness of Dr. Logan Turner, I have been enabled to study the case records of all the patients who have been operated on for tonsils and adenoids in the Ear and Throat Department of the Royal Infirmary during the last seven years. The literature on the subject for the last ten years has also been studied with special reference to the complications following operation.

In the last seven years, 7133 operations have been performed on the tonsils in the Royal Infirmary, Edinburgh. In the majority of the cases adenoids were removed at the same time. Since 1908 enucleation with vulsellum and scissors has been carried out in selected cases. Usually this was done under local anæsthesia, but in young patients chloroform was used. In the end of 1911 guillotine enucleation by the Sluder-Whillis-Pybus method was introduced in the case of in-patients. Since the summer of 1912 this method has been carried out as a routine practice, in place of tonsillotomy with the McBride tonsillotome, which up till then had been the usual method of removal. The anæsthetic used in all cases, except those of enucleation by dissection, was ethyl chloride.

STATUS LYMPHATICUS, ETC.

Out of the 7,133 operations there were two deaths, the details of which are now given :

CASE 1.—M. B—, girl, aged six. Tonsillotomy and removal of adenoids under ethyl chloride July 11, 1910. Next day she vomited several times. Pulse in the evening 194, temperature 97·8° F., respirations 30. Breath had sweet fruity odour. Acetone in urine. Vomiting persisted till the morning of the 18th, when the patient died. Two hours before death, pulse 164, temperature 102°, respirations 54. *Post-mortem* : Acute fatty change in all the organs. Probable cause of death, delayed anæsthetic poisoning.

CASE 2.—J. B—, female, aged seven. Tonsils enucleated with the guillotine on May 14, 1913. Nothing unusual noticed at operation. On the 15th, fairly well during the day; vomited a little mucus when the throat was painted. Temperature rose in the evening to 100·2 F. Did not sleep well. About 6.20 a.m. on the morning of the 16th the nurse noticed that the patient was very cold and dusky, and that the pulse could not be felt. Pupils were dilated, tongue dry, throat clean, no hæmorrhage. In spite of energetic restorative measures, the child died at 7.10 a.m. *Post-mortem* refused. Probably *status lymphaticus*.

Several similar cases have been already recorded. Packard (1) had a case where one tonsil was removed by dissection and the

other with the guillotine after freeing the pillars. Ether anaesthesia lasted 14 min. Five hours later, pulse 156, temperature, 38.5°C ., respirations 36. Death $6\frac{1}{2}$ hours after operation. Probably *status lymphaticus*. Harris (2) reports a very interesting case of a man aged thirty, apparently healthy. After injection of cocaine and adrenalin he became pale and vomited. There was deep cyanosis. The operation was hastily completed, but the patient became pulseless and died. *Post-mortem*: The right side of the heart was dilated. Enlarged glands in axilla and groin. Thymus weighed 18 gm. Death was attributed to *status lymphaticus*. Probably cocaine poisoning was also a factor. Kahler (3) reports a case of death following tonsillotomy due to *status lymphaticus* in presence of a compensated heart lesion. Farrell's (4) case was one of death with cyanosis after operation for tonsils and adenoids under morphia and ether narcosis. He explained death as due to no one cause, but a combination of many. Hurd (5) notes two deaths from *status lymphaticus*, and one on the operating table due to the anaesthetic. These occurred in a total of 11,245 cases. In all cases ether was the anaesthetic used. Kofer (6) had a case of sudden death on the day following the operation of tonsillectomy in a woman aged thirty-two. *Post-mortem*: Mitral stenosis and *status lymphaticus*. In all, eight cases of death from *status lymphaticus* or similar causes have been recorded within the last ten years.

HEMORRHAGE.

In the series now analysed, there were nine cases of serious hæmorrhage. Of these cases four followed tonsillotomy, and of these four, two were cases of reactionary hæmorrhage and one was secondary. One case had reactionary hæmorrhage, followed on the fourth day by secondary hæmorrhage, necessitating the application of artery forceps, which were left in position all night. Three hæmorrhages followed enucleation by dissection, one primary hæmorrhage, one reactionary, and one secondary. The remaining two cases followed enucleation by the guillotine, neither of which was so severe as to cause alarm. One was reactionary and one was secondary, occurring six days after the operation. The source of the bleeding in nearly all of the cases was from a vessel high up in the posterior pillar.

Out of the numerous recorded cases of hæmorrhage following operation, several are worthy of note. Kofer (6) reports a case of a woman, aged thirty-two, suffering from chronic nephritis, whose

tonsils were enucleated by the snare. Hæmorrhage was so severe that it could only be controlled by ligaturing the external carotid. Marschik (7) reports a similar case of tonsillectomy, in which he attributes the hæmorrhage to chronic nephritis and the onset of menstruation. The bleeding was controlled on the left side by sewing the pillars together, and on the right side only by ligaturing the external carotid. Crockett, of Boston (8), reports two cases of death within two minutes after attempts to enucleate the tonsils with a sharp scalpel. The internal carotid is the only vessel which could account for such cases. Nettebrock (9) has collected 150 cases of hæmorrhage in the last sixty years, of which seven were fatal. Steward (10) reports an interesting case of a fatal result from hæmorrhage in a boy aged seven. Operation for tonsils and adenoids under ether. Severe primary hæmorrhage, which soon stopped. Four hours later both sides of the neck and the left cheek were swollen by extravasation of blood, which spread to the sternum, pharynx, larynx and trachea. Intubation and tracheotomy were performed. Death occurred in thirty-two hours. Hurd (5) reports a case of hæmorrhage followed by pneumonia and death, after tonsillectomy. Stucky (11) also reports a fatal case of hæmorrhage after tonsillectomy, and nine cases of secondary hæmorrhage requiring a second narcosis and ligature of vessels or suture of the pillars.

The source of bleeding was not stated in all the cases, but, as far as can be ascertained, in all except the cases mentioned by Crockett, the bleeding was from branches of the external carotid. It must be borne in mind that the internal carotid lies at some distance behind and external to the tonsil, and thus is not very liable to injury from tonsillotomy or tonsillectomy. Occasionally one meets with abnormalities in the course of this artery. The writer has seen a case where the artery described a complete loop before entering the base of the skull. In such a case it is possible that the artery might be wounded in opening a peritonsillar abscess. It is interesting in this connection to note the figures given by Newcomb (12) as to the source of bleeding in peritonsillitis, whether spontaneous or after incision. Fifty-one cases of hæmorrhage were collected by him, of which 54 per cent. were fatal. In the fatal cases *post-mortem* showed that in the majority of cases the internal carotid was the source of the hæmorrhage.

With regard to the question as to whether tonsillotomy or tonsillectomy is the more dangerous operation, from the point of

view of hæmorrhage, the figures of Burack (13) Chiari (14), etc., are of some assistance in arriving at a conclusion. Thus, Burack had eight cases out of 2000 tonsillotomies, Chiari twenty-seven cases out of 600 tonsillotomies, Dutrow (15) had five cases out of 200 tonsillectomies, and Goodale (16) had ten cases in the last six years, during which he had only performed tonsillectomies. From this, one must conclude that in competent hands guillotine tonsillectomy is no more dangerous than tonsillotomy. Indeed, there has been a very noticeable decrease in the amount of primary hæmorrhage in the Royal Infirmary since tonsillectomy was adopted. Enucleation by dissection is, however, more serious, as, when bleeding occurs, it is apt to be severe and to require energetic measures for its arrest. Barnes' (17) experience has been that hæmorrhage is less frequent after tonsillectomy than after tonsillotomy, while Goodale's experience has been the contrary.

SEPTIC COMPLICATIONS.

Severe septic complications have been few in the Royal Infirmary series. One patient developed broncho-pneumonia a few days after tonsillotomy and removal of adenoids. One patient developed enlarged cervical glands after tonsillotomy, but carious teeth were present, and may have been the cause. In one case a large retropharyngeal swelling appeared a few days after tonsillotomy, and was followed by enlargement of the cervical glands, which passed off in a fortnight. Several patients had dirty throats after tonsillotomy and tonsillectomy, accompanied by slight rise of temperature. In the case of tonsillectomy the sore throats were almost entirely at the commencement of the series, and were almost certainly due to trauma from faulty technique. In eleven cases acute suppurative otitis media followed operation for tonsils and adenoids. In one case also acute otitis media, followed by meningitis and death, occurred soon after tonsillotomy and removal of adenoids. One patient went to a theatre the next day after having her tonsils enucleated, and developed acute articular rheumatism. Several patients developed rashes indistinguishable from scarlet fever and German measles, and one took whooping-cough immediately after operation. It is possible that some of the rashes were septic rashes.

Numerous septic complications have been recorded by various writers, some of which show features of interest. Barth (18) had two cases which developed acute rheumatism after tonsil-

lectomy, while Dabney (19) had one similar case. Stucky (11) and Dubar (20) have had cases of acute phlegmon of the neck following removal of tonsils. Dean (21) notes a case of death from sepsis following tonsillectomy, a case of cerebral thrombosis after tonsillotomy, and a case of gangrene of the muscles of the neck after tonsillectomy. Dabney (19) had a case where tonsilleectomy was done with great difficulty owing to a bad anæsthesia. This was followed, on the second day, by hyperpyrexia and delirium, which lasted for a week. The maximum temperature was 105° F. Kobrak (22) out of 100 cases had fever in 38. The maximum fever occurred on the second day, and its average duration was 3.3 days after operation. Burack (13) out of 2000 cases had fever in 58.

The appearance of a rash indistinguishable from scarlet fever occasionally occurs on the second or third day after operation, and has been noted by Wingrave (23), Forsyth (24), Broeckhaert (25), and Burack.

INJURIES TO PALATE, ETC.

With regard to the question of injury to the palate, scarring, paresis, etc., I shall give the results of sixty cases who reported out of 200 gniillotine enucleations for which I was personally responsible. Of these sixty, two had damage to one posterior pillar. In five there was some scarring with slight pulling down of the palate, but good functional result. In twenty-nine both pillars were separate on both sides with no scarring. In the remainder there was more or less fusion of the pillars on one or both sides. In several there was temporary nasal speech, but in none was it permanent. Recently a patient came to the Royal Infirmary who had had her tonsils removed elsewhere, and in whom the edge of the palate showed a tense, hard scar. Nasal speech in this case was persistent.

Pearson (26) found occasional nasal intonation in two out of fifty-three cases of enucleation by dissection. In these cases there had been some damage to the pillars with subsequent scarring and pulling down of the palate. In eight cases, also, there had been occasional regurgitation of fluids through the nose for a fortnight. Stucky (11) records a curious case, where facial paralysis came on after tonsillectomy and lasted five weeks. He also had two cases where paresis of the palate lasted several weeks. Pagnat (27) had a case where there was paralysis of one side of the palate after

application of the galvano-cautery to the tonsil. The patient felt an acute pain, and nasal speech was noticed immediately afterwards. Dabney (19) had a case where spasmodic laryngeal stridor occurred daily in a child, aged fifteen months. In another case aphonia followed the operation. He attributes injuries to the pillars and palate to bad anæsthesia, and my own experience tends to confirm this.

MISCELLANEOUS COMPLICATIONS.

A few other rarer complications have been met with and recorded. A case of fatal angioneurotic œdema after tonsillotomy by *morcellement* was recorded by van Iterson (28) in a man, aged twenty. Death occurred in a few hours from dyspnœa. The *post-mortem* showed œdema of the larynx and lungs. The family afterwards gave the information that the patient was subject to sudden swellings. Parish (29) records a case of extensive subcutaneous emphysema of the neck and face immediately after operation during ether anæsthesia. Cyanosis was marked. Pulse 128. Absorption of air in three days.

Having mentioned some of the unpleasant sequelæ of tonsil operations, I shall now pass on to consider the choice of method. From the third to the fifth year of life, the lymphoid tissue of the tonsil is in a state of active proliferation. After the age of five or six this is not so marked, and at puberty the tonsil undergoes considerable atrophy. From the researches of Hett (30) and Butterfield (31) it is known that in man the tonsil is in one of its most highly developed forms. In most other mammals the tonsil is of a more primitive type, many of the forms corresponding with stages in the development of the human tonsil. From this, one is bound to conclude that the tonsil should not be regarded as a vestigial structure, and that in early life it probably has some function, even if it be only the production of lymphocytes. I do not intend to discuss the function of the tonsil in this paper, but there is some evidence in support of the view advanced by Good (32), that in early life it acts as an organ which immunises the body against the more common infections. After an exhaustive series of researches, Caldera (33) was unable to discover any specific function in the tonsils of adults and adolescents.

From the foregoing considerations, the writer would recommend that in children of three or under, tonsillotomy should be preferred to tonsilleectomy unless the tonsils are manifestly septic and seriously

affecting the health of the patient. In older patients, one must again consider whether tonsillotomy or tonsillectomy is to be recommended. In practised hands, guillotine tonsillectomy gives very satisfactory results. My own figures show that 93 per cent. have had a complete anatomical enucleation by this method. Tonsillectomy has no complications which are not found also with tonsillotomy, and it has the advantage that there are no recurrences of enlarged tonsils after it. Minor undesirable results, such as scarring or pulling down of the palate, are nearly always due to faulty technique. Of the sixty people who reported, out of 200 enucleations, twenty-nine had both pillars perfectly separate, and the palate was freely movable. In twenty-four the pillars were more or less fused on one or both sides, but the palate was freely movable with an excellent functional result. Some weeks after tonsillectomy it is very common to see a small fold coming from between the two pillars low down, and running on to the tongue. Frequently at its lower end a few lymphoid nodules are seen. This appearance may be attributed to contraction of the deep cavity left by the tonsil pulling up the mucous membrane from the root of the tongue. This fold becomes much less distinct as time goes on.

Of the patients who reported, only two had had any illness since operation, namely, one whooping-cough and one influenza. Most of them had had sore throats before operation, while only three had had mild sore throats since. It is noteworthy that in those cases a small tag of tonsil was still present. The dates of reporting were from four to twenty-two months, the greatest number being about a year after operation.

The disadvantage of tonsillotomy is that the submerged part of the upper pole is nearly always left behind, and tonsillitis and peritonsillar abscess are not uncommon results.

In adults who have had repeated peritonsillar abscesses the guillotine enucleation is not always successful, as in those cases the tonsil is frequently fixed by adhesions to the superior constrictor, and for a successful enucleation by the guillotine a movable tonsil is essential. A failure to enucleate completely in these cases is particularly undesirable, so in most cases of repeated peritonsillar abscess it is preferable to enucleate by dissection with scissors and snare.

I have had no experience of the effects of enucleation on the singing voice, but Pearson (26) notes the result of enucleation by dissection in ten singers, nine of whom were amateurs, and one a professional. All the amateurs declared that their voices had

improved, while the professional noticed no difference, although the pillars were fused on both sides and the palate was asymmetrical. Dabney (19) finds that a clean tonsillectomy will increase the singing register by two tones, but Hudson Makuen (34) is more in favour of leaving the capsule in the case of singers.

CONCLUSIONS.

(1) Although the complications of operations on the tonsils are comparatively rare, considering the large number of operations performed annually, when they do occur they may take a very grave form leading to a fatal termination.

(2) Tonsillectomy by means of the guillotine is not a more serious operation than tonsillotomy, although it requires considerably more skill to perform satisfactorily, *i. e.* to enucleate cleanly with the capsule entire.

(3) The end result of tonsillectomy is more satisfactory than tonsillotomy, as there is no recurrence of symptoms referable to the tonsils.

(4) Tonsillotomy is preferable in children under three years of age.

(5) Tonsillectomy is the operation of choice in all children over five years, in adolescents, and in certain adults.

(6) Enucleation by dissection with scissors and snare should be recommended in adults who have had repeated peritonsillar abscesses.

In conclusion, I wish to express my great indebtedness to Dr. Logan Turner for his kindness in placing his material at my disposal.

REFERENCES.

- (1) PACKARD, F. R.—*Amer. Journ. of Med. Sciences*, September, 1910.
- (2) HARRIS, T. J.—“Ann. Meet. Amer. Laryngol. Assoc.,” 1909.
- (3) KAHLER, O.—*Vers. Deutscher Naturf. u. Aerzte in Salzburg*, 1909.
- (4) FARRELL, F. H.—*N. Y. State Med. Journ.*, 1912.
- (5) HURD, L. M.—*Journ. Amer. Med. Assoc.*, 1912.
- (6) KOEHLER, K.—*Monatsschr. f. Ohrenheilk.*, 1911.
- (7) MARSCHIK.—*Wiener Laryngol. Gesellsch.*, January, 1910.
- (8) CROCKETT, E. A.—*Boston Med. and Surg. Journ.*, 1911.
- (9) NETTEBROCK.—*Dissert.*, Kiel, 1908.
- (10) STEWARD, F.—*Lancet*, November, 1902.
- (11) STUCKY, J. A.—*Laryngoscope*, 1912.
- (12) NEWCOMB, J. E.—“Ann. Meet. Amer. Laryngol. Assoc.,” 1908.
- (13) BURACK, S.—*Zeitschr. f. Laryngol.*, 1911.
- (14) CHIARI, O.—*Vers. Deutscher Naturf. u. Aerzte in Salzburg*, 1909.
- (15) DUTROW, HOWARD V.—*Laryngoscope*, 1912.
- (16) GOODALE, J. L.—*Internat. Med. Congr. London*, 1913.

- (17) BARNES, H. A.—*Boston Med. and Surg. Journ.*, 1911.
- (18) BARTH.—*Laryngol. Gesellsch. zu Berlin*, 1913.
- (19) DABNEY, VIRGINIUS.—“Ann. Meet. Amer. Laryngol. Assoc.,” 1913.
- (20) DUBAR.—*Progrès Médical*, 1906.
- (21) DEAN, L. W.—*Laryngoscope*, 1910.
- (22) KOBRAK, F.—*Arch. f. Laryngol.*, 1907.
- (23) WINGRAVE, W.—*Lancet*, 1902.
- (24) FORSYTH, E. A.—*N. Y. Med. Journ.*, 1901.
- (25) BROECKHAERT, J.—*Arch. Internat. de Laryngol.*, 1910.
- (26) PEARSON, J. H. H.—*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1912.
- (27) PUGNAT, A.—*Rev. Hebdom. de Laryngol.*, 1910.
- (28) ITERSON, C. J. A. VAN.—*Niederl. Ges. f. Hals- u. Ohrenheilk.*, 1910.
- (29) PARISH, B. D.—*Laryngoscope*, 1910.
- (30) HETT, G. S.—*Lancet*, February, 1909.
- (31) HETT and BUTTERFIELD.—*Journ. Anat. and Phys.*, vol. xlv.
- (32) GOOD, R. H.—*Laryngoscope*, 1909.
- (33) CALDERA, C.—*Ricerche sulla fisiologia delle tonsille palatine*, Turin, 1913.
- (34) MAKUEN, HUDSON.—“Ann. Meet. Amer. Laryngol. Assoc.,” 1911.

A NEW THEORY OF HEARING.

BY F. P. STURM, CH.M., M.B.,

Fellow of the British Oto-Laryngological Society; Surgeon to the Leigh Infirmary, Lancashire.

THIS theory of hearing is based upon the supposition that the hair-cells of the organ of Corti respond to sound in the same manner that the rods and cones of the retina respond to light, that is, by an actual process of contraction.

There is nothing unreasonable in such a supposition, for it has been clearly demonstrated that the rods and cones actually do contract and shorten under the influence of light, and to these the hair-cells of Corti, which are certainly concerned with the perception of sound, are in every way comparable, for they are ectodermal cells which have acquired the ability to respond to a special stimulus, and to it alone.

Not only is this supposition not an unreasonable one in theory, but it is also supported by a very considerable amount of histological evidence. It is supported by the infinite variety in the length and shape of the hair-cells as seen in preparations from fresh human and animal labyrinths.

Its strongest support is the fact that it affords a clue to the functions of those intra-labyrinthine structures whose uses have for ever been a matter of pure conjecture.

It is a theory which is applicable to all the facts. It affords a reasonable and acceptable explanation to the functions of the hair-

cells themselves, of the tectorial membrane, of the reticulate membrane, of the basilar fibres, and it throws an illuminating sidelight upon the nature of the so-called spiral ligament.

In the present preliminary communication I do not propose to produce any evidence, either histological or experimental, upon which this theory is founded, but to state it briefly and dogmatically.

(1) The hair-cells of the organ of Corti are the end-organs of the auditory nerve. They respond to the stimulus of sonorous vibrations in two ways—the body of the cell by contraction, the sensory hairs by sympathetic vibration.

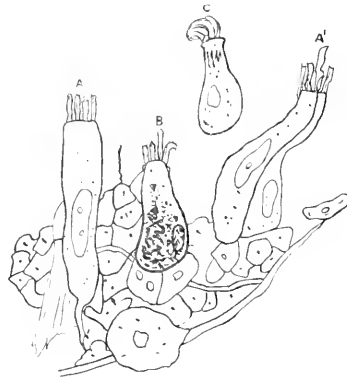


FIG. 1.—*Hair-cells*.—A, A'. Resting or soundless cells. B. Contracting or sound-adapted hair-cell. The lower pole of a contracting cell is darker and more granular than that of a resting cell, and its nucleus is obscured. c. Hair-cell with hair bent down (from pressure of damper?).

(2) The contraction of the cell frees the hairs from the pressure of the tectorial membrane, which acts as a damper. The cells contract until they are beneath the level of the reticulate membrane, whose function it is to prevent this heavy damper from sinking down upon the contracted cell.

(3) Sound vibrations reach any particular hair-cell or set of hair-cells by means of the fibre or fibres of the basilar membrane which support them.

(4) The so-called *ligamentum spirale* is in reality a muscle, and acts as the tensor of the basilar membrane. It is thus able to not only induce and inhibit paracsis by locking and unlocking the rods of Corti, but also to produce any degree of tension in every fibre of the basilar membrane, thus providing what is practically an infinite capacity for sympathetic response to sound-waves.

Let us first consider the condition of affairs in a hypothetical ear which is receiving no sound vibrations whatever and which we will call "the silent ear."

The thick, heavy, pulpy tectorial "membrane" (which in the fresh labyrinth is not a membrane, but has very much the consistency of a jelly-fish) fills up practically the whole of the cochlear canal, pressing upon and effectually damping the hairs of Corti as they project through the interstices of the reticulate membrane. Every hair-cell from the base to the apex of the cochlea endures this pressure and is damped by it, and every radial fibre of the basilar membrane has the pressure exerted by this damper in some degree transmitted to it by these hair-cells and is damped likewise.

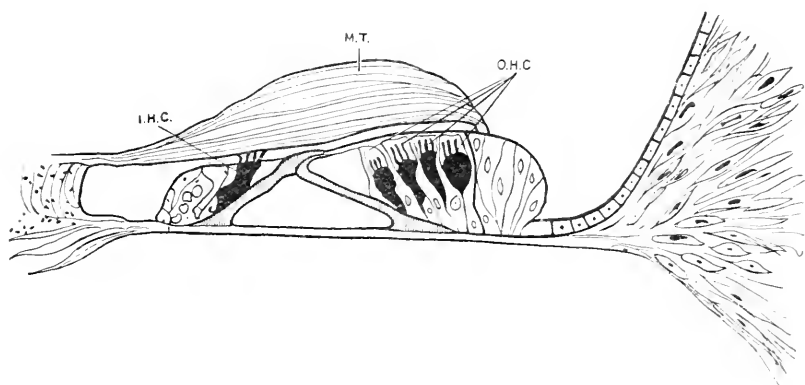


FIG. 2.—Diagram illustrating the silent and the sound-adapted ear. A sound-pattern of a certain kind has stimulated the outer hair-cells (O.H.C.), which have consequently contracted beneath the level of the reticulate membrane, thus freeing their hairs from the pressure of the tectorial membrane (M.T.). This illustrates the sound adapted ear. The silent ear is illustrated by the inner hair-cell (I.H.C.), which has received no stimulus and is still damped.

We may compare the silent ear to the dark-adapted eye. We have a potential organ of sense awaiting the stimulus that is proper to it, and we have to consider, in the light of the present theory, what happens when that stimulus arrives. Take a simple and easily illustrated case. Suppose the particular stimulus to be such a combination of sound-waves as will call into sympathetic activity the hair-cells overlying one fibre or set of fibres of the basilar membrane.

The hair-cells contract as soon as the stimulus reaches them, and by contracting they not only free the sensory hairs from the damping pressure of the tectorial membrane, but they relieve also the underlying fibre or fibres of the basilar membrane from the

same pressure. As the hair-cells shrink away the heavy, elastic expansile tectorial membrane attempts to press after them, but it cannot do so because of the reticulate membrane which arrests it.

The hair-cells are free, for they have shrunk beneath the reticulate membrane, which is now a roof above their heads, and the underlying segment of the basilar membrane is free, and now the undamped fibres and the free hair-cells can fully respond to the particular "sound pattern" which has awakened their activities, and transmit their impressions through the cochlear branch of the auditory nerve to the cortex, which interprets them as a particular sound.

With regard to the share which the ligamentum spirale has in the intricate mechanism of auditory accommodation, I shall, in this communication, merely state that many experiments and clinical and histological observations have convinced me that there must be an intra-labyrinthine muscle capable of altering the tension of the basilar fibres and Corti's rods, and I believe that there is sufficient evidence to warrant at least the provisional assumption that this muscle is the spiral ligament.

The size of this so-called ligament is entirely disproportionate to its function, if such is merely to attach the edge of the basilar membrane to the outer wall of the labyrinth. It is, moreover, possible to demonstrate the fact that the nucleated spindles, of which it is largely composed, all radiate outwards from its attachment to the edge of the basilar membrane.

My own observations, carried out upon fresh human and animal labyrinths, leave no room for personal doubt that these nucleated spindles are a form of plain muscle-fibre, in many ways analogous to those which Schäfer has demonstrated as constituting the long-disputed dilator pupillæ of the human eye.

CLINICAL NOTE.

HYPERPLASIA OF THE NASAL SEPTUM ASSOCIATED WITH NASAL POLYPI.

BY W. J. HARRISON, M.B.,
Newcastle.

ALTHOUGH some hyperplasia of the septal mucous membrane is not uncommon, particularly over the tuberculum septi or when pus is present in the accessory sinuses, so marked a condition as that described below unattended by suppuration appears to be rare.

Mr. F—, aged forty-nine, was sent to me on account of deafness of long standing which had been getting rapidly worse.

He had been very subject to colds for some years, and in the intervals he was troubled by a fairly copious discharge of clear fluid from both nostrils and a heavy feeling in the head. Five years ago he had polypi removed from the left side and was told that the right side also required to be cleared, but owing to business matters he neglected having anything further done.

On examination the left side was found to be free from any recurrence, nor could any sign of pus be found either at the first or any subsequent examination.

On both sides there was a clear air-way in the region of the inferior turbinates and the septum was of normal thickness.

Immediately above this the septum was enormously thickened, especially on the right side, where it completely blocked any view of the middle turbinate region, being in contact with the outer wall of the nose. The thickening was soft, and dimpled on being touched with a probe. On the left side the thickening was not so marked, and it could be seen that the enlargement was not uniform, but that the mucous membrane was thrown into irregular folds or lobes. By measurement the septum was found to be $2\frac{1}{2}$ cm. thick at the anterior part.

By posterior rhinoscopy the upper and lower portions of the septum appeared normal, but the central half was enlarged and appeared about 1 cm. thick. No pus could be detected. Cocaine and adrenalin reduced the swelling to about half its usual size, and polypi were seen and removed from the right side. Neither the number nor size of these was great. After their removal one could make out that the enlargement extended backwards in the middle turbinal region and was apparently connected with the swelling seen by posterior rhinoscopy. At no time could any trace of pus be found, the only discharge being clear and watery.

By repeated applications of the cautery the septal swelling was reduced till free nasal respiration was established. The rhinorrhea was cured, and the sense of smell, which had been very much impaired, was greatly improved. When last seen some months after the last cauterisation the septum was nearly normal in thickness, and the patient said that he had been entirely free from colds, that his head symptoms had disappeared, and that his general health had much improved.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

January 9, 1914.

DR. D. R. PATERSON, *President, in the Chair.*

Thickening of the Palate and Upper Part of the Larynx, probably due to Congenital Syphilis.—H. Lambert Lack.—The cases showed diffuse thickening of the uvula, pillars of the fauces and adjacent parts of the soft palate, and of the epiglottis, arytenoids and

upper part of the larynx. The condition was chronic and had not yielded to treatment by iodide or mercury or salvarsan. It was apparently stationary or varied very little and showed no tendency to ulcerate. There was occasionally slight difficulty in breathing. The cases were similar to two others he had previously shown, about which differences of opinion have arisen. In all but one the Wassermann reaction had been positive and the diagnosis of congenital syphilis rested entirely upon this. In none of the cases had any treatment been beneficial, nor had microscopical sections of portions of tissue removed thrown any definite light upon the pathology.

The PRESIDENT had seen several such cases and had been at a loss for an explanation, though most of them were before the days of salvarsan or the Wassermann reaction. As none of them improved under anti-syphilitic treatment, one was inclined to put syphilis out of court.

Dr. DUNDAS GRANT inquired whether thyroid extract had been given in combination with anti-syphilitic remedies, as it had been found that interstitial keratitis in children did not yield to ordinary specific treatment, but a beneficial effect was brought about when thyroid gland was added. He had not had an opportunity of trying it.

Mr. STUART-LOW had had two cases of this kind in which ordinary specific treatment was of no use. He had found the application of menthol ointment and massage to the sides of the neck most beneficial. Exercise for the muscles of the pharynx, particularly singing and reading aloud, had been very useful. In the cases shown the tonsils were large and very septic, and he strongly recommended that they should be enucleated and the adenoids removed. It was quite likely that these septic conditions aggravated the pharyngeal trouble.

Mr. HERBERT TILLEY said the point mentioned by Mr. Stuart-Low had also struck him when looking at the first case. As Dr. Lack had a series of cases it would be interesting if he were to enucleate the very large tonsils in the first case. Two of the three cases had abnormally large tonsils, and on that account alone it might be wise to enucleate in order to eliminate any possible septic factor in the cases. He referred to Dr. Brown-Kelly's interesting monograph on the subject, in which there were histological observations on some of his cases.¹

Dr. FITZGERALD POWELL said that the odd thing was that despite the use of salvarsan the Wassermann test remained positive. It appeared to be the result of congenital syphilis in which the infiltration and thickening remained.

Pharyngeal Pouch; Removal under Local Anæsthesia.—W. H. Kelson.—Patient, a male, aged seventy, was admitted to hospital in November, 1913, with the diagnosis of stricture of the œsophagus. He had had increasing difficulty in swallowing for four years and was getting steadily thinner and weaker. After examination suspicions were aroused as to the correctness of the above-mentioned diagnosis, and an X-ray examination clearly demonstrated the presence of a pouch dipping down to the aortic arch and lying behind and a little to the left of the œsophagus. As the patient appeared to be going downhill somewhat rapidly it was decided to operate, and to avoid all risk of post-anæsthetic vomiting I decided to use local anæsthesia. Operation was performed on December 3 after injection of a solution made from three "tablets"

¹ See also Dr. Logan Turner's article, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, February, 1914, p. 57 and *seq.*

(B. & W.), each containing cocaine mur. $\frac{1}{5}$ gr., morph. mur. $\frac{1}{40}$ gr., along the line of the proposed incision. Hæmorrhage was trifling. It was found necessary to divide the omohyoid muscle.

X-ray Report.—December 1, 1913: The posterior mediastinum is clear, except at the level of the top of the aortic arch, where there is a definite shadow. A spoonful of bismuth glycerine (thick emulsion), when swallowed, shot down rapidly to the level of the top of the aortic arch and lodged in a pouch at this level. Bismuth emulsion (thin) filled this pouch to the top and then overflowed to the left, running straight down through the œsophagus and entering the stomach without delay. The pouch remained full after many minutes, and no bismuth passed down the œsophagus, except over the top of the pouch. After drinking pure water the pouch still remained full, and when the patient lay on the couch no bismuth escaped from the pouch in any position. This is a typical pharyngeal pouch, causing difficulty in swallowing by displacing and compressing the œsophagus just above the level of the top of the aortic arch.

January 30, 1914: A thick bismuth emulsion passed through the œsophagus with perfect freedom, and there was no obstruction or deviation at the seat of the former pharyngeal pouch. A little bismuth entered a slight pit at the level of the epiglottis, but passed out again immediately; this recess is considerably higher than the opening of the pouch and has evidently no connection with it; it is *not* pathological.

The PRESIDENT said it was an object-lesson of what large operations can be done under local anæsthesia.

Mr. NORMAN PATTERSON asked whether Dr. Kelson found the fundus of the sac at the level that the skiagram showed it to occupy. A skiagram taken in the erect posture, with the sac filled with bismuth mixture, might show the fundus to be lower than it actually was.

Dr. KELSON replied that there was nothing very special about the technique. All that he felt anxious about was lest he should wound the recurrent laryngeal nerve, which was in close contact with the sac; for that reason he was glad the patient was not under a general anæsthetic. That was the reason why enlarged thyroids were sometimes removed under local anæsthesia. He thought the sac passed down to the level of the aorta, because when his finger was enucleating it he could feel the aorta beating on the back of his forefinger.

Dr. JORDAN pointed out the characteristics which distinguished a pouch from an organic stenosis. When the patient swallowed the bismuth one saw the pouch fill, and then the bismuth was seen to overflow from the top and run down in a full stream to the stomach. In a case of organic obstruction one could see a thin stream of bismuth trickle down from the lowest part of the pouch. The condition present in Dr. Kelson's patient was now called a "pharyngeal pouch." There was a true œsophageal pouch sometimes seen radiographically, and sometimes accidentally discovered *post-mortem*; he believed it had no clinical significance. In the *post-mortem* room he had sometimes seen a little fossa into which one's finger could be placed below the bifurcation of the trachea. A fossa of this kind was sometimes seen immediately below the projection always present where the right bronchus crosses in front of the œsophagus. He would like to know if such œsophageal pouches had ever been known to give clinical evidence of their existence.

Sinus Suppuration in Young People.—Dan McKenzie.—*Case 1: Frontal Sinusitis in a Girl, aged seven.*—There was a curious history in the

case. About three months before she came to hospital the patient was overturned by a bicycle and thrown on her face. A fortnight later pain and swelling in the left supra-orbital region and around the left eye set in, together with headache and pyrexia. After about ten days of fever and headache, the patient being confined to bed, a sudden gush of pus from the left nostril took place. Thereupon the pain ceased, the fever left her, and the child was able to be up and about; but the discharge from the nose continued. When she came to hospital pus was seen to be oozing freely from under the left middle turbinal. A skiagram showed well-marked frontal sinuses on both sides, and the left frontal sinus together with the left antrum threw shadows. Treatment was confined to nasal drainage; the left middle turbinal was removed and nasal antrostomy performed, and the discharge gradually ceased.

Case 2: Double Maxillary Antrum Suppuration in a Girl, aged twelve.—The condition was subacute. After washing out the cavity several times with a Lichtwitz trocar, the radical antrum operation was performed on the left side and simple nasal antrostomy on the right. The discharge had now ceased.

Case 3: Left Frontal Sinusitis in a Girl, aged fifteen; Radical Killian Operation; Necrosis of the Bridge.—The patient is now aged seventeen, her operation having been performed two years ago. The case was one of ethmoidal suppuration with polypi. After curetting and drainage the presence of headache and local pain led to the radical frontal sinus operation (Killian). The bridge necrosed and was removed a fortnight later, but the wound has healed with very little deformity on account of the natural flatness of the patient's nose. There was still a fair amount of discharge.

The PRESIDENT said the first case was of interest in that the cause was due to some injury. The influence of trauma in frontal sinusitis came perhaps more often before those who practised in industrial districts, owing to claims for compensation. He had been consulted in regard to one or two such cases. He did not doubt that even comparatively small injuries had some effect in inducing frontal sinus trouble. He remembered a man who had a blow, not severe, on the forehead, which was followed by sinusitis and the discharge of matter through the nose a fortnight later. He would like to hear, in regard to Case 2, what principle determined the choice of the radical operation on the left side, and a simple nasal opening on the right.

Mr. HERBERT TILLEY for some time had suggested that these suppurative inflammations were more common in children than they had been supposed to be, or than text-books stated. Some years ago he had shown a boy whose sinus had suppurated in the course of scarlet fever. The boy's age was eight. Last January, during the epidemic of influenza, he saw a girl, aged nine, who had a temperature of 102° F., with great pain on one side of the head. It was due to an acute empyema of the frontal sinus. Under cocaine he had no difficulty in irrigating the sinus, though she was a nervous little patient. After three or four irrigations she got well in ten days. He believed some of the cases of so-called nasal catarrh in children would be found, on investigation, to be sinus suppuration; he was therefore in the habit of transilluminating these cases, especially during influenza or epidemics of acute specific fevers.

Dr. DUNDAS GRANT, in reference to the use of the term "subacute," asked how long the maxillary antrum suppuration lasted.

Dr. DONELAN asked what were the reasons, in the second case, for discriminating between the two sides in the nature of the operation. The

radical operation seemed unusual for so young a child, and in his experience it was necessary only in about 4 per cent. of even very chronic cases. By making a large drainage through the antro-nasal wall and allowing a reasonably long period of treatment this comparatively small cavity got well without further operation in the vast majority of cases, and in many became almost obliterated within a year or two. Another advantage of this procedure was that even if one had ultimately to have recourse to the Caldwell-Luc operation its severity was much lessened by the existence of the naso-antral opening already made.

Dr. JOBSON HORNE thought many acute and subacute cases of disease of the accessory sinuses of the nose might, with advantage, be left alone. It was noteworthy how acute and subacute disease in the antrum of Highmore cleared up without any exploratory puncturing and washing out.

The PRESIDENT said it was a practical point as to the kind of case for which the two methods should respectively be used. Moure, of Bordeaux, has brought forward, at the International Congress,¹ very definite views with regard to operation in these cases, and the experiments of Ssamoylenko showed that if one wished to obliterate the whole sinus one had to remove completely the whole mucous membrane, and that could only be done by radical methods. With regard to the influence of trauma in the compensation cases on which one was sometimes consulted, the law laid it down that if a blow contributed or in any way led to the incapacity, that blow was supposed to be responsible for the particular affection; and, whether primary or secondary sinusitis followed, the patient was entitled to compensation. He had two cases in mind: one was definitely primary, there was no previous history, and it healed up soon; in the other case it was secondary—a slumbering sinusitis was stirred up by a blow on the forehead—and intranasal, and subsequently external, operation had to be done.

Dr. DAN MCKENZIE, agreed with what had been said as to the possibility of trauma inducing suppuration, or rendering already existing acute suppuration chronic. He also agreed as to the frequency of such conditions in childhood; in childhood he believed that sinus suppuration was common, because acute otitis media was more common in children than in adults. The reason these cases did not come under their care was that the acute condition passed off in children, owing to the smallness of the sinuses and the fact that they were more easily drained. With regard to the second case, in which he did a more simple operation on one side than on the other, the case showed that the simple operation would have sufficed for both sides. The condition was subacute, only of a few months' duration. The cavities had been repeatedly washed out, but without benefit. The guide to the performance of the radical operation was when ordinary drainage did not relieve or cure the condition—in other words, when polypi were present; then it was necessary to open the antrum thoroughly and to remove the mucous membrane. The diagnosis of polypi in the antrum was difficult. With regard to operating through the canine fossa, the nerves to the canine and bicuspid teeth were cut through; he believed, however, that after a time the nerve-supply to these teeth was renewed.

Dr. DONELAN said, in regard to the diagnosis of polypi, it would often be found practicable to employ a small mirror at the naso-antral opening.

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 526.

If this opening were of good size—and in chronic cases it should be at least as large as a sixpence—a very good opportunity was afforded of thus studying the condition of the mucous membrane and its reaction to drainage and other treatment before deciding on an opening through the canine fossa. An instrument which was an adaptation of Brünings' lamp had lately been devised for examination of the antrum through a naso-antral opening.

Dr. DUNDAS GRANT said he had been able to diagnose the presence of polypi in the antrum while making Lichtwitz's puncture. The point of the instrument felt as if embedded in a soft substance.

Dr. WATSON-WILLIAMS said that, by the use of the antral suction syringes, one could frequently diagnose the presence of polypi without opening the antrum at all, and he had very often confirmed such diagnosis by subsequent operation. When using this syringe it was not necessary to make an opening into the antrum, as, by the syringe, a little distilled water was passed into the antrum, and whatever matter or discharge existed in the antrum was sucked up into the syringe. When polypi existed they generally obliterated the needle aperture on suction, and he had even removed in this way a core from a sarcomatous growth for examination by the microscopist. If such blockage on suction was not caused by a polypus, there was a neoplasm present, or else exceedingly thick and tenacious secretion. Experience of the use of the syringe in at least 200 cases showed that polypi in the antrum could thus be diagnosed with surprising frequency, and polypi were thus often detected when their presence was quite unsuspected.

Mr. CLAYTON FOX said that Mahu made a point of measuring the capacity of the antrum by injecting fluid into it, recovering it again afterwards by suction. That formed some guide as to the thickness of the mucous membrane.

The PRESIDENT said he had tried most of the methods, and was convinced that nothing but inspection through the canine fossa would give a really trustworthy impression of the condition of the mucous membrane of the antrum.

Cavernous Angioma of the Uvula.—Dan McKenzie.—Male, aged twenty-eight. The uvula presented an irregular club-shaped appearance. Its cavernous character was sufficiently obvious. No symptoms were complained of.

Dr. JOBSON HORNE recalled a similar case which was shown before the Section some years ago, in which the palate was mainly affected.

Combined Syphilitic and Tuberculous Infiltration of the Larynx.—Dan McKenzie.—The patient is a woman, aged about forty-eight. Six years ago she came under the exhibitor's care for tertiary ulceration of the nasal septum, with some redness and thickening of the vocal cords. This was cured by anti-luetic remedies. In September, 1913, she returned with infiltration of the larynx without œdema, ulceration, or any other sign suggestive of tuberculosis; but as the patient complained of cough and expectoration, the sputum was examined and tubercle bacilli found.

On October 19 an injection of neo-salvarsan was made, with immediate relief to the symptoms. The voice became clearer and the cough easier. An interesting (? Herxheimer) reaction was observed in the larynx which began the day after the administration of the neo-salvarsan, the mucous membrane assuming a livelier red, and appearing to be moister and more

succulent. This promise of benefit was not, however, realised. The infiltration increased, and as it was affecting the subglottic region, and giving rise to serious dyspnoea, she was again admitted to hospital. On November 14 salvarsan was injected, and the same evening urgent tracheotomy under local anæsthesia had to be hurriedly performed. There was no evidence whatever that the laryngeal obstruction had been increased by the salvarsan. She experienced some difficulty with the metal tracheotomy tube, which proved irritating and very productive of coughing, so a rubber tube was inserted, with immediate relief. The coughing had, however, led to a wide-spread emphysema of the tissues of the neck and thoracic walls.

Since the tracheotomy the larynx has gradually come to assume the typical aspect of tuberculosis with cedematous infiltration of the arytaenoids. The galvano-cautery puncture has been used once with some benefit.

Dr. JOBSON HORNE considered that the predominant factor in the case was tuberculosis. In his experience those who came from tuberculous stock, contracting syphilis and subsequently developing phthisis, were more liable to laryngeal lesions, and the lesion was usually tuberculous.

Dr. DUNDAS GRANT suggested that there was now sufficient room in the larynx for the patient to breathe without retaining the tracheotomy tube, and that the chance of improvement would be heightened if it were possible to do without it.

The PRESIDENT said he now had a case in which the question was whether it was predominantly one of tubercle or syphilis. The boy was aged thirteen, and there was obvious palate trouble as well as laryngeal. Wassermann's test was positive and tubercle bacilli were said to have been found in the sputum, and he reacted to tuberculin. He improved materially under iodide, and the question was raised whether he should be sent to a sanatorium. The disease in the larynx seemed to hang fire, having improved up to a point.

Dr. DAN MCKENZIE had hoped someone would allude to the complication which followed the tracheotomy. His experience was that for the first two or three days following tracheotomy the patient required much attention because awkward accidents were apt to happen, though he had not previously seen emphysema occur.

Myasthenia Gravis, with Affection of the Larynx and Soft Palate.—**Edward D. Davis.**—A woman, aged twenty-five, was admitted to hospital in February last for Raynaud's disease. She complained, amongst other symptoms, of loss of voice, difficulty in swallowing, and regurgitation of fluids through the nose. The loss of voice occurred suddenly without apparent cause in September, 1912, and was followed a little later by difficulty in swallowing and regurgitation through the nose. When seen in February, 1913, a diagnosis of functional aphonia was made, and in spite of the nasal voice and regurgitation through the nose no paresis of the soft palate was detected. Treatment by the faradic current, cold douching, valerian, etc., had no effect. At a second examination in June the condition had progressed, the paresis of the soft palate was well marked, the vocal cords abducted slightly, but remained in the cadaveric position during deep inspiration, and on vocalisation very little adduction was produced. The pharynx and palate were somewhat insensitive. The Wassermann reaction was negative. The condition of the skin was also first noticed then. It was observed on repeated examinations that the amount of paresis varied

and appeared to increase when examination was prolonged. On December 16 the diagnosis of myasthenia gravis was made, based on (1) the muscular weakness and rapid fatigue; (2) the variability of the paresis; (3) the increase of paresis on exertion and the difficulty of mastication and swallowing; (4) the affection of the cranial nerves.

Dr. GORDON HOLMES, from the neurological point of view, did not think there could be any doubt about the diagnosis, as in addition to the facts printed in the notes the patient had occasionally had diplopia during the past eight months, and difficulty in mastication and in talking, especially when tired. Further, various groups of muscles, especially in the upper limbs, could be easily fatigued: some time ago, for instance, she had great difficulty in doing up her hair, and while attending hospital she had always to rest on the way from the tram, though the distance did not exceed 100 yards. This abnormal fatiguability of the muscles is of course the characteristic feature of the disease; this patient is able to do a certain amount of household work, walk a certain distance and converse with her friends in the morning, but the fatigue in these and all other actions gradually increases as the day advances. But definite palsies, that is, more or less complete temporary or permanent loss of power of certain muscles, are frequently associated with this fatiguability, and it is an interesting fact, supported by the laryngoscopic observations in this case, that such permanent palsies are generally seen only in the muscles innervated by the cranial nerves; he had one case in which complete palsy of certain external ocular muscles had lasted about twelve years. In almost every case there is definite weakness of the orbiculares oris and palpebrarum, and in addition to the persistent laryngeal and palatal palsies this patient is unable to whistle, and has great difficulty in blowing out her cheeks, and both eyelids and lips are easily separated even when she tries to her utmost to keep them closed.

Dr. DUNDAS GRANT asked whether Dr. Gordon Holmes observed the perverse action of the muscles of the tongue in this patient. The more she tried to obey the request to put out her tongue, the more it seemed to lie in the floor of the mouth, or even to be drawn back. Possibly it was because the posterior fibres of the genio-hyoglossus had become fatigued by the examinations. He had noticed the same difficulty in a case of bulbar paralysis. The patient's right vocal cord seemed to be very paretic, but the left one was active, and she seemed to have nystagmus to whichever side she turned her eyes. He asked whether that was frequent in myasthenia gravis or more frequent in disseminated sclerosis. He would also like to hear how, except in very marked cases, one would exclude bulbar paralysis.

Sir FELIX SEMON said he probably was the first laryngologist to observe any participation of the upper air-passages in affections of this kind after the disease had been described as a definite entity. The extraordinary thing about the disease was the variability of its symptoms. Mr. Davis, in his notes of the case, spoke of the "paresis of abduction," so that the cords only opened on deep inspiration to the cadaveric position. On examining to-day, however, the glottis was found to open to the full extent, and one could not now say there was any paresis at all of the abductors. He hoped Mr. Davis would put this right, as well as the last line in the description, which stated that the diagnosis was made *inter alia* on the "affection of cranial nerves." He believed Dr. Gordon Holmes would agree that the pathology of this affection still remained obscure—*i. e.* as to whether it was primarily an affection of muscular fibres or of the nerve-end plates. At any rate he believed no affection of nuclei

had ever been found in the disease, nor any organic disease in the cranial nerves themselves. If the present statement of the note were to go forth—viz. that the diagnosis was based upon the “affection of cranial nerves,” and that primarily there had been paresis of the adductors, as manifested by the weakness of voice—that would probably be taken as a fresh proof against the validity of “Semon’s law,” that in progressive affections of the cranial nerves the abductors suffered first.

MR. SOMERVILLE HASTINGS asked if Dr. Gordon Holmes would say what was the usual termination of these cases. Some two years ago he showed a similar case in a boy, whose condition was diagnosed as myasthenia gravis, and three months after being exhibited to the Section the child died suddenly ten minutes after being seized with dyspnoea.

MR. DAVIS, in reply, said that this was the first case of myasthenia gravis he had seen. When Dr. Holmes made this diagnosis he hastened to look up the literature, and found six other cases recorded, but a laryngeal examination had been made in only two of them—namely, cases recorded by Mr. Somerville Hastings and Dr. Farquhar Buzzard. Sir Felix Semon examined the larynx of one of Dr. Buzzard’s cases. In three of the six cases affection of the palate and larynx was mentioned, but no laryngeal examination was recorded.

DR. GORDON HOLMES, in further reply, said he first saw the patient a fortnight ago and had examined her since, and each time he found the tongue movements fairly normal, but he noticed that she tired quickly when she attempted to keep her tongue out. In many cases of this disease, however, there are curious longitudinal grooves on each side of the tongue which have been attributed to wasting of the lingual muscles. He had also failed to detect any true nystagmus on the occasions when he examined her, but the ocular muscles tired easily and fixation then became defective. The differential diagnosis of this disease from true bulbar palsy is as a rule not difficult, though in the past many cases of myasthenia have been confused with it. But in ordinary bulbar palsy the masticatory and ocular muscles are not involved, the weakness is constant and not variable as in myasthenia, and it is always associated with wasting of the affected muscles of the lips, tongue, palate, and vocal cords. The termination of myasthenia gravis is almost always fatal, though some cases, especially those which start late in life, run a very slow course. The only effective treatment is to keep the patients as much at rest as possible and to spare them from stress and fatigue.

An Unusual Case of Adductor Paresis.—Edward D. Davis.—A healthy gardener, aged forty-seven, complained of loss of voice of gradual onset, and that fluids occasionally went down the wrong way, following influenza five years ago. In January, 1910, well-marked weakness of the arytenoideus, with the typical triangular interval behind the vocal processes, and the approximation of the anterior two thirds of the vocal cords was seen on vocalisation. There was no evidence or history of rheumatism or syphilis. Skiagraphy of the chest and examination by the direct method were negative. No fixation of the arytenoideus could be detected. Treatment by faradisation, valerian, etc., had no effect. An examination in June of this year showed that the paresis had progressed considerably, and that the adductor paresis is practically complete. The nervous system has been repeatedly examined, and on the last occasion by Dr. Gordon Holmes, who found no signs of organic disease.

SIR FELIX SEMON said the history was unusual, but if he had seen the case without knowing anything of the history, he would unhesitatingly

have said it was a case of functional double adductor paralysis. Even now he did not doubt it was functional.

Mr. HERBERT TILLEY asked what strength of current was used. In a case of bad or chronic aphonia it was well to give the patient full doses of strychnia, and then apply such a strength of current that it would not be forgotten. He also asked if the current was applied extra-laryngeally. In one very intractable case he had given a general anæsthetic and examined the larynx under it; then as she was coming round an intra-laryngeal electrode was passed so as to cause her to cry out and hear her own voice. The result was successful, at any rate so long as she was in hospital.

Dr. DE HAVILLAND HALL said the plan recommended by Mr. Tilley was not always successful. He had a case twenty-five years ago in which the patient screamed out violently, but she still persisted in not using her voice.

Dr. DONELAN remembered a very similar case to Dr. Hall's, in which the strongest possible current was used on several occasions through a laryngeal electrode. The voice was generally, though not always, restored, but the improvement did not continue more than a day or two. The fact was that no treatment permanently overcame the psychical condition in some of these patients. He had since been informed that the lady referred to had been cured by a visit to Lourdes.

Mr. DAVIS replied that he gave the faradic current both extra- and intra-laryngeally. The man had five or six applications. When first seen, the condition was diagnosed as functional. Strychnine was not given, but he had cold douching, valerian, etc.; even the passage of a bronchoscope was tried. The present state of the larynx seen on this occasion made it necessary to revise the diagnosis of functional aphonia.

Foreign Bodies removed from the Pharynx by Suspension Laryngoscopy.—Edward D. Davis.—(1) An open safety-pin with the bent point embedded in the posterior wall of the pharynx of an infant, aged eleven months. The lower or hinge end of the pin was about the level of the upper edge of the cricoid cartilage. By suspension laryngoscopy the pin was well seen and removed by seizing the lower or hinge end with Paterson's forceps and rotating the pin around its point. The point was then freed and the pin removed upside down with the point directed downwards.

(2) A farthing impacted at the orifice of the œsophagus and behind the lower edge of the cricoid cartilage in a boy, aged four. It could not be seen by suspension laryngoscopy, but the œsophagoscope was passed while the suspension apparatus was in position and the coin easily removed. Suspension laryngoscopy materially facilitates bronchoscopy and œsophagoscopy.

Skiagrams of a Pin in the Retropharyngeal Space.—Edward D. Davis.—A boy, aged nine, swallowed the pin shown in the skiagrams. A few days later a prolonged attempt to find the pin by suspension laryngoscopy and œsophagoscopy was unsuccessful. After localisation by more skiagrams a second attempt to find or feel the pin was again unsuccessful.

The PRESIDENT said that where the safety-pin was lodged with the hinge downwards and the point sticking up, he had, in one case, passed over the point a very fine tube, which guarded the point while it was being pulled up, particularly when it was in the gullet proper. An instrument had been invented for closing the pin first, and then with-

drawing it; but it was difficult to carry a great number of instruments about, and the plan he mentioned was more simple.

Mr. TILLEY asked whether the pin had been looked for with the X-ray screen. He had found that very valuable.

Dr. E. A. PETERS had recorded a case in a man, aged thirty, who felt a sudden pricking when swallowing food, and was admitted with urgent dyspnœa, necessitating immediate tracheotomy. He was relieved, and sat up and was feeling comfortable, but suddenly died two hours after the tracheotomy. The pin was found transfixing his jugular vein, and there was hæmorrhage right down the spine, causing œdema of the glottis.

Mr. CLAYTON FOX asked whether the application of adrenalin had been tried. Probably the head of the pin was in the pharynx, and the swelling of mucous membrane prevented it being seen.

Dr. FITZGERALD POWELL asked at what level in the neck the pin lay, and suggested the possibility of its removal by a lateral pharyngostomy, or an exploratory incision behind the pharynx.

Mr. DAVIS, in reply, said he examined the boy for over an hour with the suspension laryngoscope, with the largest œsophagoscope tubes he could introduce, and by palpation. The skiagrams showed the pin lying on the vertebral column in the retro-pharyngeal space. The X-ray screen was not used at the same time and during œsophagoscopy. After the first examination the temperature was 99° F. for one night, and that was the only temperature he had. It had been decided to wait until there was a retro-pharyngeal abscess, or other symptoms; the boy was still under observation, and if anything occurs it shall be recorded. The first skiagram showed the head of the pin to be at the upper border of the fifth cervical vertebra, which would correspond to the level of the arytenoids, but the pin seemed to have moved upwards since; the point now appeared to be at the level of the soft palate or second cervical vertebra.

Deflection of the Posterior Part of the Nasal Septum.—
Norman Patterson.—Male, aged nineteen. Patient came complaining of discharge into the back of the throat. Examination shows some displacement of the anterior edge of the quadrilateral cartilage to the left, together with a deflection of the main body of the septum to the left, and a spur on that side. The lower part of the right nasal cavity is abnormally roomy, and widens out more and more as it approaches the choanal orifice. On anterior rhinoscopy an exceptionally extensive view is obtained of the naso-pharynx and the adenoid tissue present there. Examination with the mirror shows a marked deflection to the left of the posterior edge of the vomer. It is attached in the middle line above, and here it is very broad; as it passes downwards it deviates markedly to the left, and its lower extremity is slightly concealed by the posterior end of the left inferior turbinate, which projects beyond it. The posterior end of the right inferior turbinate is separated from the septum by a considerable interval. Further, the edge of the vomer appears to slope much more obliquely forwards than is normally the case, and this accounts to some extent for the posterior ends of the inferior turbinates, which are somewhat enlarged, being on a plane considerably behind that of the lower part of the septum. The soft palate hangs well forward and the pharyngeal isthmus is abnormally wide. The patient gives the history of small particles of food, especially bread, entering the nose and having to be expelled by sneezing or blowing the nose. The hard palate,

measured from its posterior edge to the incisor teeth, is more than $\frac{1}{4}$ in. shorter than in other patients of about the same age and build. Antero-posterior measurements of the lower part of the septum give the same result. On transillumination the antrum is dark on the right side, but puncture reveals no pus in the cavity. An X-ray photograph shows the antrum to be smaller on this side. It is not easy to make certain whether or not there is any asymmetry of the hard palate, but a cast is being made. Other abnormalities presented by the patient are the absence of a lateral incisor on the left side and a very small one on the right. The uvula is bifid.

Dr. DONELAN thought that these cases were not quite so rare as had been generally supposed. He did not at all agree with the reason for their rarity given in some of even our most recent text-books—namely, that the posterior portion of the septum was the first to be developed. We all knew now that this was not the case. The line of potential weakness during growth extended quite to the posterior border. One reason they had not been more frequently reported was probably that attention was much more given to the anterior portion of the septum, and that while it was true that deformities of the posterior portion occurred rather more frequently than used to be thought along the whole line of the supra-vomerar cartilage, these were rarely of sufficient importance to attract much attention unless they were so placed and of such a size as to call for operation. During the last six months he had operated on two cases, one at the age of fourteen and the other at twenty, in which the distortion on the left side extended through the posterior border. Both cases were apparently due to the co-existence of unusually large masses of adenoids.

Dr. DAN MCKENZIE said the whole subject had been worked out by Dr. Brown-Kelly,¹ but he did not remember whether that author paid special attention to the sloping of the septum. He could corroborate what Dr. Hill said; he had noticed cases in which the septum sloped very far forward. He thought it was related to cleft palate, as there was an absence of a lateral incisor tooth on the left side.

Dr. JOHNSON HORNE considered that the deviation of the posterior part of the septum in cases of abnormal development of the nose or the palate, or the antrum of Highmore, was more apparent than real. When the development of the antrum had been arrested the choana was wider on the affected side and the septum appeared to be deflected to the opposite side. The same applied to the wider choana seen in cases of cleft palate on the same side as the cleft.

Mr. NORMAN PATTERSON had not seen anything like this case previously. He agreed that one could frequently see the posterior end of a spur with the rhinoscopic mirror, but such differed from this case, where the whole septum was deflected to one side. Had the condition been due to the extension of the sphenoidal sinus into the vomer the main deformity would have been above; here it was the lower part of the septum that showed the greatest deviation from the middle line.

Laryngeal Neoplasm.—W. JOHNSON HORNE.—The patient, a man, aged forty-six, had had an "irritable" nose all his life, and hay-fever and asthma for twenty-four years. Hoarseness developed with a "cold" ten or twelve weeks ago. Recently there had been some soreness referred to the right side of the larynx, and a little pain now and then

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxv, pp. 281, 343.

passing up to the ear on that side. The right half of the larynx was almost, if not quite, fixed; the neoplasm occupied the right vocal cord in the entire length; but so far as could be seen it had not crossed over to the left cord. The growth was irregular and sloughy. At the time of taking these notes (December 30, 1913) no glands were palpable in the neck. The patient was one of a family of twenty-five, of whom twenty-two were living, and the eldest fifty-six. When the hoarseness developed the asthma ceased. The patient had been taking iodide of potassium and mercury since December 30 last.

Dr. DUNDAS GRANT said that there was less eversion of the edges and fungation than in a case of typical epithelioma, and the centre seemed to be sloughing out. It looked exactly what one would expect to see in a foreshortened view of an ulcerated gumma.

Prof. BURGER (Amsterdam) agreed that in this case there were two possibilities: that it was a malignant growth, or that it was syphilitic disease. He agreed that most probably it was a syphilitic affection. In favour of that view there were three factors: (1) the glossy, yellowish-white aspect of the tumour and its sharp edge; (2) the dark red colour of both ventricular bands; (3) the fact that not only the left ventricular band was swollen, but the right also. The absence of swelling of the glands did not constitute an argument, but it gave support to the opinion he had expressed. He hoped the report of the Wassermann test would be known, and, later, the result of antisyphilitic treatment.

Sir FELIX SEMON said that when he first saw the case he felt no doubt that it was a malignant growth. To that view he still adhered, though he might have come to the idea on mere clinical instinct. Of course he was not unmindful of the German proverb that "night-watchmen sometimes died in the day," and his diagnosis might be mistaken, but still he thought it was right.

Mr. HERBERT TILLEY for once differed from Sir Felix in the diagnosis of this case, and agreed as to the points put forward by Prof. Burger. There was a curious easy movement of the parts around the ulcer, though he did not suggest that in every malignant case there was necessarily an immobility of the cord.

Dr. FITZGERALD POWELL considered, with Sir Felix Semon, that the case was malignant; he thought so when he examined it, and was still of the same opinion, notwithstanding the history of specific disease mentioned.

Dr. KELSON said he thought it was a fairly typical gumma, which was breaking down.

Dr. JOESON HORNE replied that when he first saw the case on December 30 he thought it was epithelioma and he was still of that opinion. However, before operating he would await the result of the Wassermann test and then act accordingly.

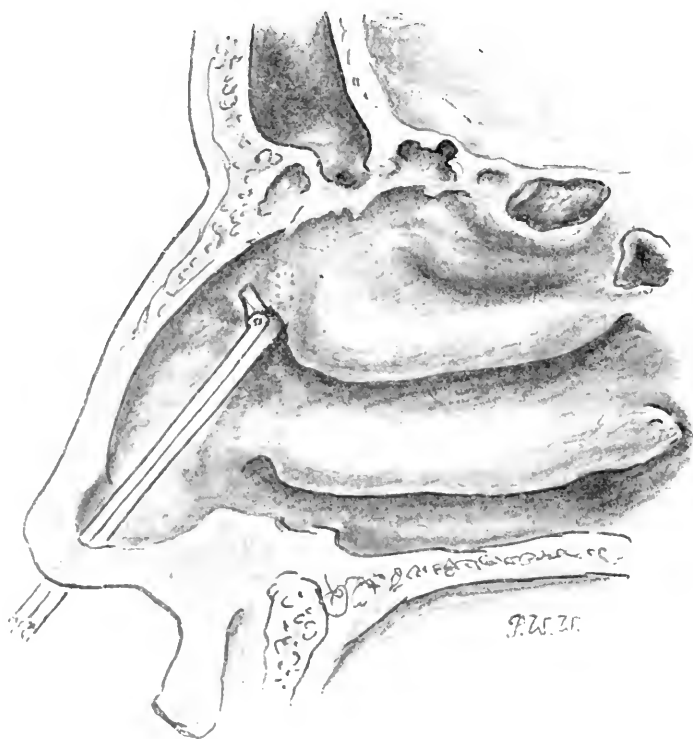
Carcinoma of the Soft Palate.—W. G. Howarth.—Ten weeks ago the patient noticed a lump at the angle of the jaw on the left side. It was not painful, but as it increased in size he came to the hospital for advice. He had not noticed anything wrong with the mouth or throat. A large mass of glands infiltrating the left sterno-mastoid have been removed. During the last few days considerable discomfort has been noticed on swallowing.

The PRESIDENT asked whether Mr. Howarth thought it necessary to remove the glands on the other side. The growth on the palate seemed to be dangerously near the middle line.

Mr. NORMAN PATTERSON said that in the case of malignant growths affecting the uvula and the central part of the soft palate, even if small, the glands on both sides of the neck should be completely dissected out.

Mr. HOWARTH agreed that the glands on both sides should be dissected out, and he would suggest that this be done.

Intra-nasal Frontal Sinus Operation; Instruments, and Skiagrams showing Results.—P. Watson - Williams.—The exhibitor



Dr Watson-Williams's method of entering and opening up the fronto-ethmoidal cells

showed the instruments he used for intra-nasal frontal sinus operations, viz. the small angular forceps, curved cutting forceps for entering and enlarging the fronto-nasal passage, and the guarded frontal sinus burr; also skiagrams of patients, showing the very large bougies which passed into the frontal sinus after operation.

Drawings illustrating the methods of operation were shown. He laid special stress on the method of entering the agger cells and fronto-ethmoidal cells without removing the anterior end of the middle turbinate, the small cutting forceps first cutting the anterior end of the attachment of the middle turbinal to the outer nasal wall in the manner he had described at the Liverpool meeting of the British Medical Association in 1912, and shown in the accompanying illustration.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL
AND LARYNGOLOGICAL SOCIETY.

Meeting at the Royal Infirmary, Edinburgh, November 22, 1913.

MR. J. D. LITHGOW *in the Chair.*

Reported by DR. W. S. SYME.

(Continued from p. 164.)

A Clinical Investigation of Otosclerosis.—J. S. Fraser and Gideon Walker.—(This paper will appear *in extenso* in a subsequent number of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.)

Dr. ADAM asked if Dr. Fraser knew anything of the incidence of otosclerosis in rheumatoid arthritis. Mr. O'Malley had recently drawn an interesting parallel between the two conditions, though he had omitted reference to this point. If the parallel held one would expect a marked incidence. He had examined some half-dozen cases of rheumatoid arthritis, some of them marked, and had found no trace of otosclerosis. From the therapeutic point of view this was important, as in that condition the treatment laid down by Sir James Barr was of undoubted value. This was dietetic, with the addition of fairly large doses of alkalies and calcium salts, Sir James Barr regarding the condition as an acidosis.

Dr. KERR LOVE thought one of the most important points was the question of heredity, and, if it was hereditary, the type of heredity which existed.

Dr. LITHGOW said that in the method of treatment suggested by Zünd Burguet, as the patient improves the cerumen secretion recommences, and this increase of wax can be used as an index of commencing improvement. In the proposed inquiry the presence or absence of ceruminous secretion might be noted.

Dr. MILNE DICKIE said there was always difficulty in differentiating between middle-ear catarrh and otosclerosis. Quite often in middle-ear catarrh there is a high degree of deafness; it seemed to him very difficult to be sure in many cases whether there was true otosclerosis or a condition of chronic adhesive process.

Dr. SYME said the amount of hearing with a negative Rinne was important. In early otosclerosis Rinne became negative, with a larger amount of hearing than in adhesive processes.

Chronic Suppurative Otitis Media; Labyrinth Symptoms; Schwartze Operation; Localised Suppuration in Mastoid Antrum; Patient Shown.—J. S. Fraser.—Female, aged fourteen, has had discharge from the left ear for eleven years with occasional attacks of pain. February 7, 1913.—Sickness, vomiting, and giddiness. Patient seen for first time on February 21. *Examination.*—Left meatus full of pus; granulations present; mastoid tenderness. Septum deviated to left. Right nose roomy and turbinates atrophic; no pus. Right ear normal; watch heard on contact with left ear; raised voice at 1 foot. Rinne, negative (left); some loss of high tones (left ear). March 6.—Headache and nausea; tenderness over tip of left mastoid, but none over antrum or posterior border. Watch, 3 in. (left). With noise apparatus in right (normal) ear she hears conversation voice at 18 in. Slight

spontaneous horizontal nystagmus to left (diseased side). Cold syringing of left ear produces nystagmus to right in forty seconds with typical falling reaction. No fistula symptom. Patient admitted and left ear syringed twice daily. March 23: Left ear almost dry; whisper, 1 ft.; watch, 4 in. March 25: Again pain in left ear; nausea and vomiting; mastoid tender. March 26: Temperature remains normal; again sickness but no nystagmus. March 28: Giddiness. April 4: Girl is better—no pain, nausea, or giddiness. *Perforation of left membrane has healed*; drumhead in-drawn and red; air does not enter tympanum on Valsalva. Watch, 6 in. (left). C32 heard by both ears; whisper, 9 ft. (left). No nystagmus; spontaneous pointing test is normal; walking with eyes shut well performed. Cold syringing of normal right ear—nystagmus to left in twenty-four seconds. Left (diseased) ear reacts in same time. April 8: Girl says she feels well. April 18: Patient has left ward, and now reports nausea in mornings; tip of left mastoid is tender; slight nystagmus to left. Left ear again discharging slightly. May 9: Attacks of giddiness; no tinnitus; slight nystagmus both sides—normal (?). C.V. at 14 in with noise apparatus in right ear. Weber to right (good ear)!. Rinne, negative left ear. Left membrane red and bulging posteriorly; sagging of meatal roof; perforation not seen. No fistula symptom. Cold syringing, left ear, first caused giddiness and then convergent strabismus (left eyeball turned in). After syringing, patient had pointing error to left. October 8: Patient returns complaining of pain in left ear; no otorrhœa; left membrane red and bulging posteriorly; no nystagmus. Marked tenderness over tip. Watch, 4 in., left ear. Weber to right. Upper tone limit (monochord), 11,000 (left); 16,000 (right). No fistula symptom. Slight spontaneous pointing error to right. Rotation to right produced giddiness, strabismus, and slight nystagmus to left; tenderness on pressure over tip of left mastoid. Patient admitted. Fundus oculi normal on both sides. October 23: Operation (J. S. F.). Tip of left mastoid removed and found normal; it consisted of fine cells and diploc. Antrum opened through healthy cortex and found to contain yellow pus; mucosa pink and thickened. Antrum appeared almost shut off from attic by swollen mucosa. Dura not exposed; no fistula discovered. Cavity packed—wound left open (tympanum not touched). October 24: Slight vomiting; no nystagmus. October 26: Dressed; wound looks well. November 6: Still going on well; whisper, 18 ft. by left ear. Left meatus dry.

Chronic Suppurative Otitis Media; Attic Perforation; Cholesteatoma; Radical Mastoid Operation; Fistula of External Canal; Serous Labyrinthitis; Recovery.—J. S. Fraser.—Male, aged twenty-four, had discharge from right ear for four years; noises in both ears, no giddiness; nasal obstruction on right side. *Examination*.—Facies of nasal obstruction; septum to right; left membrane shows chalk patch and indrawing; right membrane shows Shrapnel perforation with protruding granulation; no mastoid tenderness; watch heard on both mastoids; Schwabach lengthened; Weber to right; Rinne, negative both ears; low tones not heard either ear; upper limit, 8000 right, 10,000 left; conversation, 3 ft. right, 6 ft. left; slight spontaneous nystagmus to right and left—probably normal; *no fistula symptom*. Spontaneous pointing test shows slight deviation to right. Cold syringing, right ear, gives nystagmus to left in 25 seconds. October 23, 1913: *Radical mastoid operation* (J. S. F.).—Cortex normal, and mastoid of sclerotic type; antrum deep and contained cholesteatoma; sinus healthy; long

process of incus absent; malleus healthy; cholesteatoma in attic; bony outer wall of external canal deficient. On touching endosteum of canal with probe, eyes deviated to right. Facial nerve exposed by disease. Koerner flap, posterior wound stitched. October 24: Patient sick during night; marked horizontal and rotatory nystagmus to left (non-operated side); slight nystagmus on looking straight forward (second degree); temperature normal. October 25: Sickness continues; still nystagmus of second degree; pointing error to right. October 26: Nystagmus of third degree; patient still vomiting. October 27: Patient better; nystagmus only second degree. First dressing, all stitches removed and wound healed. Raised voice at 1 foot by right ear. Temperature normal. No sickness last night or to-day. October 30: Still nystagmus of second degree. November 3: Temperature normal. Operation cavity not packed for last three days. Nystagmus of first degree only; slight pointing error to right. Fistula symptom tested, but not obtained. Examination with tuning-forks gave same results as before operation. Conversation voice at 2 feet by right ear when left ear closed with finger; raised voice at 6 inches with noise apparatus in left ear. Hot syringing right ear (118° F.) gave nystagmus to right in 10 seconds, with pointing error to left afterwards. Upper tone limit as before. November 6: Patient up and about; no packing in right meatus; nystagmus has almost disappeared.

The Ætiological Relationship of the Faucial Tonsils to Tuberculous Cervical Adenitis affecting Children.—A. Philp Mitchell.—

In tuberculous disease of the upper deep cervical glands the faucial tonsils have an importance not hitherto well enough recognised or understood. The position of the tonsils at the entrance to the digestive tract favours infection more with food than with inspired air—a fact of great consequence in considering the frequency with which cervical glands in children harbour the bovine type of tubercle bacillus. Further, the very direct and short pathway between the tonsils and the tonsillar lymphatic glands explains the frequency with which well-marked tuberculosis of these glands may be secondary to a small focus in a tonsil.

I have investigated the faucial tonsils from sixty-four consecutive cases of children suffering from tuberculous disease of the upper deep cervical glands; twenty-four (37·5 per cent.) of these cases showed histological evidence of tuberculosis in the tonsils. There are no clinical signs by which the condition can be recognised. In the majority of cases the tonsil retains its normal appearance, is small and frequently receding. Occasionally the tonsil is flat and its surface fissured, or it may be hypertrophied, the external surface showing *no* ulceration. The chief sites for tuberculous lesions in the tonsil are: (1) surrounding the deeper parts of crypts, especially the supra-tonsillar group; (2) immediately under the mucous membrane near the mouths of crypts; (3) deep in tonsil, close to posterior capsule. The lesions may be localised or generalised. Experimental inoculation of guinea-pigs and rabbits with pieces of tonsillar tissue yielded positive results in nineteen cases (30 per cent.), and of these the bovine bacillus was present in twelve cases, and the human in three cases.

I have also investigated the hypertrophied faucial tonsils removed from ninety children, in whom the cervical glands showed *no* clinical evidence of tuberculous disease; six (6·5 per cent.) of these hypertrophied tonsils gave histological evidence of tuberculous disease, while nine (10 per cent.) yielded positive results when inoculated into guinea-pigs.

The bovine bacillus was present in three cases, and the human in one case.

General Conclusions.—Primary tuberculous disease of the faucial tonsils occurs much more frequently than previously recognised. Considering the frequency with which the upper deep cervical glands are infected secondarily to tuberculosis of the tonsils, there is absolute need of removal of the tonsils in all cases of tuberculous cervical adenitis. The hypertrophied faucial tonsil is the seat of primary tuberculosis, *rarely* as compared with tonsils from cases of tuberculous cervical adenitis.

Dr. SYME remarked that the results had been obtained from enucleated tonsils; previous results published were usually from tonsils removed by tonsillotomy. The proportion of cases showing tuberculous changes was much larger in tonsils examined after enucleation. No doubt the bacillus, as one would expect, worked its purpose in the quiet part of the tonsil, just as, for instance, in the quiet part of the lung—the apex.

Dr. ADAM asked what was the result of removal of the tonsils on the upper cervical glands.

Dr. TURNER said it was held by some that the majority of the cases of pulmonary tubercle owed their origin to infection through the faucial mucous membrane and cervical glands. He wondered if Dr. Mitchell had had the opportunity of investigating this point. Did he find that the lower cervical glands had become adherent to the apical pleura? This point had been investigated by more than one observer in the *post-mortem* room with a negative result. He had always had difficulty on anatomical grounds in understanding how the lung became involved directly from the cervical glandular chain. In fifty *post-mortem* examinations on children he had found no evidence to show a lymphatic spread from the tonsil to the apices of the lungs. The supraclavicular glands were rarely enlarged in children, much more rarely than in adults. In only two cases out of seventy-two of enlarged cervical glands in children were the supraclavicular glands enlarged.

Dr. NEIL MACLAY asked how Dr. Mitchell prevented contamination in his experiments.

Dr. MITCHELL said he could best reply to the various questions by briefly describing his technique. The tonsillar material was obtained by enucleation from children attending the Royal Edinburgh Sick Children's Hospital. The tonsils were placed in sterilised bottles and afterwards were thoroughly washed in several changes of distilled water. The obvious difficulty in inoculating animals with portions of tonsils was the presence of contamination organisms. Many methods were tried to get rid of these organisms before a satisfactory method was discovered. Observing in a paper by Twort to the Royal Society that he employed a 2 per cent. solution of ericolin for killing the contamination organisms in nasal scrapings from leprosy cases, Dr. Mitchell thought it would be well worth trying its effect on tonsillar tissue. This he found to be the most successful of all the methods he had tried. Portions of tonsillar tissue after thorough washing in distilled water were dropped into a test-tube half full of a 2 per cent. watery solution of ericolin and placed in the incubator at 38° C. for two hours. The tonsillar tissue was again washed in distilled water, and was then ready for being injected subcutaneously (in the inguinal region) into a guinea-pig. All experimental animals were killed after four to six weeks. It was found that the spleen and softened caseous lumbar glands were the structures that yielded the best

growing cultures. The cultural characters, along with the virulence test in rabbits, were sufficient for the differentiation of type. Experience had shown that the rabbit could be relied upon to differentiate between the virulence of tubercle bacilli from bovine and human sources. For testing the virulence of each virus two rabbits were injected in order to preclude any possibility of doubt as to the accuracy of the primary results. The dosage employed was .01 and .1 mgrm. of dried culture injected intravenously, or infection with 5 to 10 mgrm. by the subcutaneous method. The *bovine* tubercle bacillus produced in rabbits within five weeks an acute generalised tuberculosis ending in death from the intravenous injection of .01 or .1 mgrm. of culture. With the *human* tubercle bacillus intravenously inoculated in the same doses the lesions were limited, usually confined to the lungs and kidneys, progressed slowly, were almost never generalised, and death seldom resulted. He had experienced no difficulty in classifying the cultures into bovine and human types, *i.e.* no intermediate types were present in his series. It was interesting to note in connection with these tonsil investigations that in seventy-two children with tuberculous disease of the upper deep cervical glands the bovine type of bacillus was present in sixty-five instances (90 per cent.), and the human bacillus in seven (10 per cent.). His results differed widely from those of investigators in other countries, but he believed they could be verified by a consideration of several correlative factors: (1) the almost universal practice in this country, especially in Scotland, of feeding children with unsterilised cow's milk. In his series, 84 per cent. of the children two years of age and under had been nourished from birth with unsterilised cow's milk. This he thought an important factor. (2) The very inadequate supervision of the milk supply in Edinburgh and in Scotland generally. Although the number of byres in Edinburgh had been reduced from 140 in 1900 to 76 at the present time, the number of tuberculous cows removed annually from the city byres remained practically the same. The city Veterinary Inspector had ordered on an average the removal of thirty tuberculous cows annually from the city byres, and of the thirty about ten had tuberculosis of the udder. In addition there were about 250 byres beyond the city boundary where there was practically no supervision whatever, and from which about two thirds of the city's daily milk supply came. The greater opportunities for infection of human beings by milk supplied from country byres were obvious.

PROCEEDINGS OF THE SOCIETY OF GERMAN LARYNGOLOGISTS.¹

Stuttgart, 7th and 8th May, 1913.

Translated by THOMAS GUTHRIE.

Paralysis of the Recurrent Laryngeal Nerve in Mitral Stenosis.
—Killian (Berlin).—A consideration of the topography of the heart and great vessels proves that direct compression of the left recurrent

¹ Two articles, one by Prof. Kahler, and the other by Dr. W. Albrecht, have already appeared in full in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY. See pp. 7 and 71 of the present volume.

nerve by a dilated auricle is quite impossible, nor in the author's opinion is the paralysis to be explained as the result of indirect pressure through the medium of the pulmonary artery. He believes that it is always due to secondary causes, of which the most frequent are affections of the lymph-glands in the neighbourhood of the bifurcation and possibly also changes in the parts about the pericardium.

Prof. KÄHLER expressed the view that in some cases the paralysis was due to pressure by the left bronchus which has been found displaced and flattened against the aortic arch by the dilated auricle.

Unpleasant Events attending Irrigation of the Antrum.—Killian (Berlin).—During the last ten years the author observed quite a number of cases in which a rise of temperature occurred a few hours after exploratory puncture. In each of them this occurred as a result of the *first* washing, and the antrum contained masses of purulent material which had been present for a long period and had become more or less decomposed. It seems probable that so long as the deposit is not interfered with absorption is slight, but that any disturbance greatly favours the passage of toxic substances through the lining membrane of the cavity. A case was mentioned of sudden blindness of one eye following immediately after puncture of the corresponding antrum. The blindness was complete for about fifteen minutes, after which the sight gradually returned, and was normal on the following day. The oculist to whom the case was referred suggested as a possible cause a small embolus causing temporary obstruction of the central artery of the retina, but Killian preferred to explain the occurrence as due to reflex vascular contraction. Reflex irritation of the vagus has been observed in a number of cases taking the form of fainting, which is especially apt to occur if the lotion used for syringing be of too low a temperature. In one case this vagus reflex was so violent that sudden death took place in an otherwise healthy man as a result of a simple exploratory puncture.

(Diathermy) The Cold-cautery in the Upper Air-passages.—Albanus (Hamburg).—In this method an induced alternating current of enormous frequency and very high tension is employed, and, although the cautery point itself remains cold, coagulation of the tissues occurs to a greater or less depth. The smaller the point of the electrode the greater is the concentration of the current and the more rapid and more deep the necrosis of the tissues. Dr. Albanus has treated some 300 cases of lupus and tuberculosis of the nose and throat by this means with very encouraging results.

Fatal Meningitis, the Result of Injury to the Dura in Removing the Middle Turbinal.—Kümmel (Heidelberg).—The patient, a very strongly built engine-driver, was sent to Dr. Kümmel by another specialist who had three days previously removed the polypoid anterior end of the right middle turbinal. There was three years' history of nasal trouble and the occasional removal of polypi, and during the last year there had been some complaint of headache. Removal of the portion of turbinal was followed by a discharge of pus, and the same evening the patient was seized with very severe headache, repeated vomiting, and finally became unconscious and had remained so ever since. The symptoms were those of meningitis, and a Killian's radical frontal sinus operation was performed and the frontal lobe exposed and punctured, only blood and clear cerebrospinal fluid under pressure being removed. The patient died two

days later without regaining consciousness. The *post-mortem* examination disclosed generalised meningitis, and, on raising the right olfactory bulb, a narrow, slit-like opening in the dura about $\frac{1}{2}$ mm. long through which a sound could be passed directly into the nasal cavity. This opening was situated on the right cribriform plate opposite about the middle of the crista galli. The posterior part of the crista could be moved from side to side together with the attached portion of the bony septum; either a fracture had occurred at this point and had been accompanied by tearing of the dura, or, as appeared more probable, the bone of the cribriform plate had been gripped by a narrow conchotome and the dura cut or torn through with it. The case is reported in order to lay stress on the importance of exercising the greatest care when working in the region of the base of the middle turbinal, a definite ledge of which should always be left untouched when clearing out the ethmoid. In a disease of this nature—in itself so rarely fatal—while the treatment should be thorough it is better to do too little rather than too much. The excellent cutting instruments obtainable at the present day are apt to be dangerous weapons in the hands of the unwary, or those who have not a complete knowledge of the anatomical details of the region in which they are working.

A Note on the Diagnosis of Cancer of the Larynx.—Killian (Berlin).—A case was reported in which the clinical features were those of epithelioma affecting at first the left ventricular band in a man, aged fifty-three. Three portions, however, removed at intervals for microscopical examination were reported by competent pathologists to show benign pachydermatous changes only. Later, the growth having extended, and the affected side of the larynx become immobile, a fourth portion was removed, and pronounced somewhat doubtfully to be a carcinoma. As from a clinical standpoint there could no longer be any doubt about the matter, a complete laryngectomy was performed. A wedge-shaped piece was then cut from the margin of the growth in the excised larynx, and contrary to all expectation reported as non-malignant. Finally, a portion taken from the centre of the tumour and extending well into the neighbouring healthy tissue below it, was considered in view of certain minute details of cell structure limited to a few areas to justify a diagnosis of carcinoma. The case demonstrates the greater value in conditions of this sort of clinical observation as compared with microscopic examination.

Dysphagia in Laryngeal Tuberculosis.—Rethi (Budapest).—The author described an apparatus by means of which it is possible to exert constant pressure on the point of entry into the larynx of the superior laryngeal nerve on both sides of the neck. Pressure applied in this way, at first for two hours and later for one hour daily, gave complete relief from pain on swallowing in three cases in which dysphagia had been a very marked feature.

A Rare Cause of Difficulty in Swallowing.—Marx (Heidelberg).—One case was reported fully and another briefly mentioned in which difficulty in swallowing had persisted for some years and was found to be due to pressure on the lower part of the œsophagus by a portion of the abdominal contents. Careful examination by radiography demonstrated that the condition was one, not of diaphragmatic hernia, but of *Eventratio diaphragmatica*, in which the abdominal and thoracic organs are still separated from one another by the diaphragm, but the latter is atrophied and so greatly stretched that a part of the contents of the abdomen pass upward into the chest. The condition can only be diag-

nosed by help of the X rays, which show that the upper limiting line of the stomach and intestine undergoes the normal respiratory displacement, that is, descends on inspiration, and rises on expiration, while in a case of diaphragmatic hernia the movements are reversed. Eventratio is much less frequent than hernia: of the former, fifteen cases have been diagnosed during life, and nine others discovered *post-mortem*, while about 500 cases of diaphragmatic hernia are on record. In only one other recorded case of eventratio was there difficulty in swallowing, while in both the author's cases this was the only symptom.

New Methods for the Direct Examination of the Larynx.—Katzenstein (Berlin).—A Whitehead's gag having been placed in position and opened, a bent spiral tube of large calibre is introduced into the larynx under guidance of the mirror. The obturator used for its introduction is then withdrawn, and in its place is passed a short straight tube, and the upper end of the spiral tube is screwed to the upper branch of the gag. The apparatus then lies firmly fixed in position and the interior of the larynx can be inspected with forehead-lamp or reflector. Another form consists of a single tube with three jointed sections at its lower end. The tube is introduced under guidance of the laryngeal mirror with the jointed portion in the form of a curve. A screw mechanism at the upper end of the tube then permits of the curved part being straightened, so as to provide a direct view of the laryngeal cavity. As in the case of the first model, the outer end of the tube is attached to the upper branch of the gag.

Abstracts.

PHARYNX.

Whale, Harold.—The Remote Results of Tonsillotomy and Tonsillectomy. "Lancet," February 15, 1913, p. 444.

An analytical scrutiny of 220 unselected cases. Discussion on tonsillotomy and tonsillectomy has hitherto centred around technique, and we do not yet know if the tonsil is a friend or an enemy. From the author's survey he concludes: (1) That tonsillotomy is disadvantageous because it may initiate an infection or the original trouble may recur. (2) That tonsillectomy is disadvantageous from risk of serious hæmorrhage, risk of later deformity, risk of later voice troubles. Tonsillectomy, however, is more likely to cure the trouble for which advice is sought.

Macleod Yearsley.

O'Malley, J. F.—The Difficulties of Tonsillectomy and how to Deal with them. "Lancet," July 5, 1913, p. 19.

The author briefly describes his method of operating. The types of tonsil presenting difficulties are: The left tonsil in all cases; the very large tonsil; the "immobile" tonsil; the small, flat, friable tonsil; the "pulpy" tonsil. Other difficulties are—removal of the uvula, button-holing the soft palate, removal of portions of the anterior pillar, tearing of posterior pillar, removal of part of the pharyngeal aponeurosis, tearing the mucous membrane over the point where the soft palate lies in relation to the hamular process, and hæmorrhage. These are dealt with in a lucid manner, and the paper should be read *in extenso* for the method of meeting and avoiding such difficulties.

Macleod Yearsley.

NOSE.

Lovell, A. G. Haynes.—**The Vaccine Treatment of Hay-Fever.** "Lancet," December 21, 1912, p. 1716.

A short note of six cases. One, a woman, had suffered from hay-fever for two years, but the ophthalmic-reaction showed her to be insusceptible to 5000 U.P. She was, therefore, not treated. The other five cases were all positive with 150 U.P., and all were benefited by inoculation treatment, but none were cured.

Macleod Yearsley.

Bowen, H. M.—**Two Cases of Air Embolus following Exploratory Puncture of the Antrum of Highmore.** "Annals of Otology," vol. xxii, p. 180.

The first case was a woman, who became rigid and cyanotic, and remained unconscious for seventy-two hours. She recovered by the fifth day. The second case, a man, aged twenty-four, was attacked similarly, and died an hour after the puncture.

Macleod Yearsley.

Kubo, I. (Fukuoka, Japan).—**Sphenchoanal Polypi (Kubo).** "Archiv für Laryngol.," vol. xxvii, Part II.

In the year 1908 the author published his conclusions as to the origin of the majority of the so-called solitary choanal polypi from the mucous membrane of the maxillary antrum. He has since then met with a number of cases, four of which are reported in this paper, in which a choanal polypus grew from the interior of the sphenoidal sinus, especially from the neighbourhood of the lower margin of its ostium. These polypi remain at first within the cavity of the sinus, but later grow to such a size as to obstruct completely both choanæ. In virtue of their point of attachment and short pedicle they bear a considerable resemblance to naso-pharyngeal fibromata. The opening of the sphenoidal sinus is in these cases unusually large. The author believes that most of the so-called choanal-edge polypi are in reality sphenchoanal polypi. Simple removal with the snare is not sufficient; the sinus itself must receive appropriate treatment.

Thomas Guthrie.

LARYNX.

Sobernheim and Caro (Berlin).—**Recurrent Paralysis in Heart Disease.** "Arch. für Laryngol.," vol. xxvii, Part III.

Although disease of the heart has been recognised as a cause of recurrent paralysis for some fifteen years, but few cases of the kind have been recorded, especially in Germany. The author adds four to their number. The first was a boy aged fifteen, with mitral insufficiency and left recurrent paralysis. The case was remarkable in that a considerable improvement of the cardiac condition after three months' treatment was followed by complete disappearance of the paralysis, which had up to the time of writing shown no tendency to return. Both in this case and in the second the paralysis was probably the result of compression of the nerve by an enlarged left auricle. In the third case the paralysis was attributed to pericarditis causing a serous infiltration of the nerve, the result either of the venous obstruction or of an extension of the inflammatory process. In the fourth case marked kypho-scoliosis was present, and *post-mortem* examination showed that the left-sided recurrent paralysis was due to direct pressure on the nerve by the dilated left auricle.

Thomas Guthrie.

EAR.

Ruttin, Erich.—**The Pathology of Labyrinthitis.** "Annals of Otology, etc.," xxi, p. 714.

Illustrated by six well-executed micro-photographs. The author states at the outset that he is guided by two fundamentals—(1) Not to destroy a still functioning labyrinth; (2) the simple surgical principle, *ubi pus ibi evacua*. He enumerates the following more or less well-defined clinical pictures for classification: (1) Circumscribed labyrinthitis; (2) diffuse serous secondary labyrinthitis; (3) diffuse serous induced labyrinthitis; (4) diffuse suppurative manifest labyrinthitis; (5) diffuse suppurative latent labyrinthitis; and deals with them in detail. He considers that every suppurative labyrinthitis requires wide opening and drainage, since every patient thus afflicted has meningitis hanging over his head. In the two forms of serous labyrinthitis the radical mastoid operation alone should be performed.

Macleod Yearsley.

Glogau, Otto.—**Syphilis of the Inner Ear.** "Annals of Otology, etc.," xxi, p. 703.

An excellent *résumé* of the subject. The author recognises (1) labyrinthitis with slow progress; (2) with rapid progress; (3) with apoplectic form onset. In dealing with the acoustic nerve, he enumerates syphilitic processes at the base of the brain or within the petrous bone: (1) primary gummatous neuritis, in the early syphilitic stage; (2) gummata and periostitis of the petrous; (3) basal gummatous meningitis; (4) chronic inflammation of the dura (paralysis by compression); (5) syphilitic affection of the outer cranial periosteum. In conclusion, he points out: (1) In all cases of middle and inner-ear affection the tuning-fork tests should be applied both in dispensary and private practice. Thus in many cases syphilitic aural affections may be diagnosed. (2) All cases of involvement of the labyrinth and of the middle ear, especially of otosclerosis, should be scrutinised for syphilis by investigating the previous history, inspecting the skin and orifices, and by applying the Wassermann test. (3) Early anti-syphilitic treatment may, in some instances, restore the hearing and equilibrium, while in overlooked cases catheterisation and other routine procedures hasten the destructive process.

Macleod Yearsley.

Fowler, E. P.—**Report of a Case of Sequestrum of the Semi-circular Canals.** "Annals of Otol., Rhinol., and Laryngol.," vol. xxi, p. 312.

Patient, a woman, aged forty-five. History of three months' suppuration in the right ear, following influenza. An extensive mastoidectomy was performed. Three months later, discharge having continued, complete facial paralysis occurred. A secondary operation was done, and a portion of the vestibule with the three semicircular canals was removed intact.

Macleod Yearsley.

Leidler, B.—**The Indications for Labyrinthotomy.** "Arch. f. Ohrenheilk.," Bd. xciii, Heft 1 and 2, p. 73.

This clinical study, which should be read in its entirety, is based upon twenty-seven cases of labyrinth operation in Prof. Alexander's clinic at Vienna from 1907 to 1913. It has been undertaken with the

object of grounding the indications for opening the labyrinth upon a secure foundation.

After a brief summary of the views published by various authorities, the author proceeds to enunciate the lessons derived from an analysis of the cases as follows :

(1) Every diseased labyrinth, originating in purulent otitis, whether acute or chronic, which is associated with a labyrinthogenic intra-cranial complication, must at once be operated on, and undoubted constant headache, localised on the affected side, is to be considered as one of these intra-cranial complications.

(2) Every diseased labyrinth originating in acute or chronic otitis, with the symptoms of acute diffuse labyrinthitis—that is to say, deafness, nystagmus of the third degree to the affected side, and loss of the rotation and caloric reactions—when the temperature is higher than 100.5° F. (38° C.), or when the symptoms persist with at least the same intensity for more than four days, must at once be operated on.

(3) A labyrinth which, as a result of acute or chronic otitis, is functionally destroyed, although it does not come into the categories mentioned in (1) and (2), must be opened when the cortical or radical mastoid operation is performed, if (*a*) a pathological breach of the perior endo-lymphatic space (fistula, cholesteatoma, sequestrum, tumour, etc.) is evident anywhere on the bony capsule; or (*b*) persistent symptoms of irritation of the static labyrinth exist (vertigo, nystagmus, vomiting).

These three rules have been based upon clinical findings solely, all reference to the still unsettled question of serous or purulent labyrinthitis being ignored.

The allusion to the temperature in the second heading depends upon the fact that in a serous labyrinthitis which only temporarily abolishes labyrinth functions, the temperature is never more than 100.5° F. (38° C.), and a diminution in the intensity of the symptoms is noticeable in, at the longest, four days.

The total mortality of the cases operated on, excluding two deaths in which signs of meningitis were present prior to operation, was 24 per cent.

In several of the fatal cases the onset of the labyrinth symptoms took place shortly after the performance of the simple radical mastoid operation at which granulations or polypi were noted in the neighbourhood of the oval window. Prior to the simple operation the labyrinth reactions were present, and in one of these cases there is a note to the effect that the granulations were left undisturbed. That these post-operative cases are difficult to handle is evident from the fact that in one of them the labyrinth was opened and drained two days after the radical operation, in another the opening was not made until seven days after the radical operation, six days after the first appearance of nystagmus. Yet both of these cases were fatal.

The labyrinth was operated on, in most of the cases, by Alexander's method—that is, from behind after exposing the dura of the middle and posterior cranial fossæ.

Dun McKenzie.

Macleod Yearsley.—The Prevention of Deaf-mutism. "Annals of Otol-ogy, etc.," xxi, p. 585.

The author believes that all otologists should turn their serious attention to the study of deaf-mutism, and obtain a practical knowledge, not only of its causes, but also of the psychic problems presented by the

deaf-mute and of the methods of dealing with him educationally. He gives statistics of 1076 cases under his own charge and discusses the figures briefly, and pleads for the application of eugenic principles to the problem of congenital deafness, for the combating of superstitions about otorrhœa, for better care of the ears during the exanthemata, for honest, consistent and scientific legislation upon syphilis, and for the better and more systematic teaching of the principles of otology in our medical schools.

Author's Summary.

Frazier, Charles H., M.D. (Philadelphia).—Intracranial Division of the Auditory Nerve for Persistent Tinnitus. "Journ. Amer. Med. Assoc.," August 2, 1913.

This paper is a plea for more frequent resort to surgical measures for the relief of lesions of the eighth or auditory nerve. The indications for section of the eighth nerve are: (1) Aural vertigo, (2) persistent otalgia, and (3) persistent and intractable tinnitus. The appropriate cases are those of labyrinthine disease. The deafness resulting from complete division of the auditory nerve would be an objection to the operation, were it not for the fact that as a rule the patient is already deaf on the affected side.

The operation consists in removing the portion of the occipital bone between the emissary sinus and the median line, and from the level of the lateral sinus downward for 3 cm. On the reflection of a dural flap, the cerebellar hemisphere is very gently raised and pushed backwards by a brain-retractor until the petrous bone is uncovered as far as the internal auditory meatus.

The auditory nerve is then separated from the facial, and divided with alligator scissors and the wound closed.

In the isolation of the auditory from the facial nerve special emphasis is laid on the necessity of patience, artificial illumination and the assistance to be derived from electrical stimulation.

Birkett (Rogers).

Dench, Edward Bradford.—Otitic Meningitis Treated by Drainage of the Cisterna Magna. "Laryngoscope," September, 1913.

A record of three cases treated by the method introduced by Haynes.

(1) A child, aged three and a half, with a history of left otorrhœa for one week, some pyrexia for two days, and pain in the head for twenty-four hours. There was a large perforation in the lower segment of the left membrane with purulent discharge yielding a streptococcus. No mastoid tenderness. Slight rigidity with Kernig sign on right side, absent knee-jerks and flexor plantar reflex. No nystagmus. From the slight degree of fever (101° F.) and elevation of pulse-rate (108) with absence of mastoid tenderness the case was regarded as one of tuberculous meningitis. A radical mastoid operation showed fluid in the mastoid cells and bulging dura in middle and posterior fossæ. Two days later owing to greater rigidity and rising pulse-rate (150) and temperature (103°), the cisterna magna was drained in mid-line. Fluid was under pressure and apparently sterile. Improvement took place for three days, but the child then became worse and died on seventh day after drainage of the cisterna.

(2) Infant, aged five months. A simple mastoid operation was performed for an acute mastoiditis with fever (temperature 105°). Two days later, owing to the onset of convulsions, the cisterna was drained. Improvement took place for two days, the temperature dropping to normal,

but the child then become worse, and died four days after the drainage operation. Streptococci were present in the aural discharge, but the cerebro-spinal fluid, although under tension, was sterile.

(3) Boy, aged eight, who, two days after a radical mastoid operation for chronic suppurative otitis media, developed symptoms of meningitis with pyrexia (105°) and rigidity. Lumbar puncture gave purulent but apparently sterile cerebro-spinal fluid with normal carbohydrate content and an absence of globulins.

Four days after the mastoid operation the cisterna was drained, but death took place four days later without any marked relief of symptoms.

The author is of the opinion that these were very suitable cases in that the cerebro-spinal fluid was sterile. From the experience of these three cases he does not think that the method seems to do much more than drainage by other routes. He found the operation easy to do and did not find it necessary to use other than the ordinary mastoid instruments. It is a pity that apparently *post-mortems* were not performed.

A. J. Wright.

REVIEWS.

Le Affezioni Dell'Orecchio Nell'Adenoidismo (Aural Complications of Adenoids). By DOTT. R. VITTO-MASSEI. Estratto dagli Atti della Clinica Oto-rino-laringoiatrica della R. Università di Roma, anno 1912. Jori e C.: Via delle tre Pile, 5, Rome, 1913.

This octavo brochure of 108 pages is a recent addition to a subject which is not yet exhausted. It is welcome as it shows the good work being done in the clinic of oto-laryngology in Rome, where it was inspired by work under Prof. Ferreri; it is, indeed, a reprint from the annual volume of proceedings for the year 1912, published by the Royal University of Rome. It attracts our attention as the work of the son of Prof. Massei, of Naples, the *doyen* of Italian laryngology. Finally it is welcome for its own value, as it not only gives a history of the subject with a most complete bibliography, but the writer's own researches are of much interest.

The introductory chapter shows how long a new discovery may tremble on the verge of revelation until the arrival of an investigator endowed with the necessary imagination and courage. Luschka's tonsil was fully described by Schneider in 1655; it was further studied by Santorini and Haller. Troeltsch nearly discovered the source of many ear troubles when he explicitly gave his opinion that the naso-pharynx represented the point of departure of many aural affections. About 1856 Czerinak was the first to see, with the aid of the newly invented laryngoscope, the Luschka tonsil on the roof of the naso-pharynx. But the genius of the discoverer was still wanting. It arrived in the person of Wilhelm Meyer, a Danish surgeon, and the exact date was October 22, 1867. On that very day he was struck with the fact that a young woman suffering from deafness, whom he had treated without relief, always breathed with her mouth open. The idea flashed through his brain of making a digital examination of her naso-pharynx; there his finger encountered the soft growth which we all know so well. He removed it with his ring curette. Thirty-one years afterwards, viz. on October 25, 1898, a monument to the memory of Wilhelm Meyer was unveiled in his native city of Copenhagen. Amongst those present was this peasant woman whose case gave rise to the remark-

able discovery, and who, with preserved hearing, was able to listen to the address delivered by Sir Felix Semon.¹ But this is a digression.

We have noticed how the tonsil of Luschka had been anatomically described by Schneider in 1655. Long before then Hippocrates just missed recognising adenoids clinically, for he had noted that individuals who "had a hard palate like the inside of a horse's saddle, with badly placed teeth and frequent headaches, were very subject to running of the ears." The disease was again just missed in the Middle Ages. For instance, Aubigné described Francis II (1559) as "*un de ceux qu'on appelle mal-nez, ne se purgeant ni par le nez, ni par la bouche, la quelle il portait ouverte pour prendre son vent, dont se forme un abcez à l'oreille et puis ses coliques fréquentes, marques mortelles a tel âge, ne promittaient de lui aucune duree aux plus advisez.*" Many a generation of "mal-nez" had still to put up with ineffectual "purging by the nose and by the mouth" until that peasant woman entered Wilhelm Meyer's study in 1867. Henry II of France died of meningitis, secondary to an old ear affection, and from his appearance, doubtless secondary to adenoid vegetations.

But this is again a digression into which I have been led by the excellent writing of Dr. Vitto-Massei. It leaves me little space to refer to his interesting study of the geographical distribution, the frequency and causes of ear troubles in adenoid subjects, the pathology, symptoms and treatment, nor to the results of operation, the question of adenoids and deaf-mutes, or to ear troubles produced by these growths in school-children, soldiers and workmen.

For all this and for the value of his own personal researches I must refer the reader to the book itself. It only deals with the ear complications of adenoids, but in this it is so thorough, so interesting, and, as they say in France, so *bien documenté*, that no work touching the subject of adenoids would be complete without a reference to it.

StClair Thomson.

NOTES AND QUERIES.

The Annual Meeting of the French Oto-rhino-laryngological Congress will be held in Paris from May 11 to May 31 next. The set discussions are "The Indications and Technique of Laryngectomy," and "The After-Dressing of Mastoid Operations." Secretary: Dr. Depierreis, 10, Rue Soufflot, Paris.

The Congress of German Laryngologists will be held at Kiel on May 29 and 30 next.

Secretary: Prof. Kahler, Karlstrasse 54, Freiburg.

Dr. W. Permewan, Surgeon in Charge of the Throat and Ear Department of the Royal Southern Hospital, Liverpool, has been appointed Lecturer on Laryngology in the University of Liverpool.

His numerous friends, both at home and abroad, will be interested to hear that Dr. Dundas Grant has recently undergone an operation for appendicitis. We are glad to be able to intimate that he is making very satisfactory progress towards recovery.

¹ An excellent plate of Wilhelm Meyer and a photograph of his monument are to be found in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOL., for December, 1898.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

**INTRANASAL OPERATIONS FOR FRONTAL SINUS
SUPPURATION.¹**

BY P. WATSON-WILLIAMS, M.D.LOND.,

Lecturer on Laryngology and Otology, University of Bristol, and in charge of the
Ear, Nose and Throat Department, Bristol Royal Infirmary.

Two years ago a special discussion took place in this Section on the "Present Position of the Treatment of Purulent Discharge from the Frontal Sinus"²; now we propose to consider more fully one of the points touched on in that earlier discussion, viz. the intranasal operative treatment of the same affections. In the course of my introduction to that discussion in 1911, I emphasised "the complete efficacy of these intranasal methods in a considerable percentage," maintaining that they are "more desirable methods of treatment than external operation even if not resulting in absolute cure, provided the symptoms are not such as to make more drastic operative treatment really necessary." Since that time I have endeavoured to improve the technique of intranasal operations, and to overcome the disadvantages and certain risks inherent to the methods hitherto employed.

It may be taken as common ground—

¹ Introduction to discussion on the Intra-Nasal Treatment of Frontal Sinus Suppuration at the Laryngological Section of the Royal Society of Medicine. April 3, 1914.

² *Proc. Roy. Soc. Med.*, June, 1911.

(1) That whenever operative measures are called for, an efficient intranasal operation, if that be possible, is to be preferred to external operation, unless (a) symptoms indicative of intracranial complications or of bone necrosis or osteomyelitis are present; (b) or there exist ocular complications which render anything short of a complete radical operation a source of increased risk to the patient.

(2) That we meet with cases of frontal sinusitis which require no operation at all, while of those that do a certain percentage recover completely with simple catheterisation and lavage after anterior middle turbinectomy.

I do not propose to describe in detail these slight operative procedures which are universally recognised as being often efficient and which we have all practised on many occasions.

(3) That certain anatomical conditions must always impose limitations on the efficacy of any possible intranasal operation.

We may therefore narrow down the discussion to a consideration of (1) the relative value of various methods of operating intranasally for frontal sinus suppuration as measured by the increased percentage of cure or efficient relief afforded thereby, (2) their relative merit from the standpoint of safety.

HISTORICAL SURVEY.

Probably the pioneer in deliberately establishing drainage of the frontal sinus by an intra-nasal penetration of the frontal sinus was Schäffer¹ when in 1890 he published his method of penetrating the floor of the sinus at a point corresponding to the medial part of the nasal crest of the frontal bone, *i. e.* internal to the attachment of the middle turbinal plate. To reach this he introduced a stiff metal sound 2 mm. thick, or a stiff steel spoon-ended sound, passing it up between the middle turbinal and the septum along the posterior surface of the saddle of the nose, where it was made to pierce the frontal sinus floor. He then curetted the sinus with the spoon-end as far as he could reach and touched the exposed area with 5 per cent. chromic acid. He operated in this way twenty-six times without mishap. Schäffer was followed by Winckler,² who employed a straight sound, and by Lichtwitz,³ who used a straight penetrator, 1½ mm. thick, and the latter reported successful penetration in three cases and failure in seven, after which he abandoned the procedure.

¹ *Deutsch. med. Woch.*, 1890.

² *Münch. med. Woch.*, 1892.

³ *Therap. Monatsch.*, 1893.

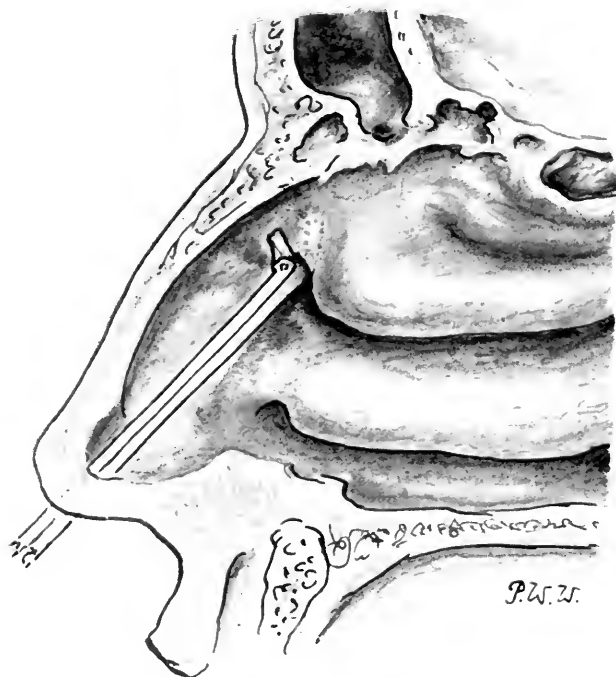


FIG. 1.—To show the initial point of entry in the intranasal frontal sinus operation. The small sphenoidal forceps are seen cutting the point of attachment of the middle turbinal to the outer nasal wall, thus entering the fronto-ethmoidal cells.



FIG. 2.—To show the author's small sphenoidal forceps clipping down walls of the ethmoidal cells external to the vertical plate of the middle turbinal.

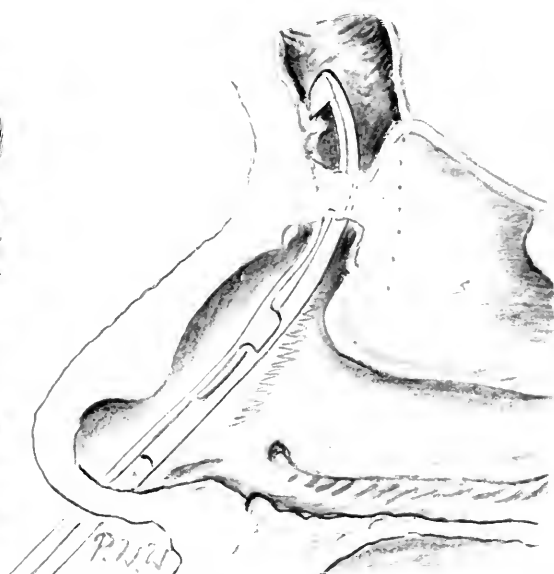


FIG. 3.—The sliding cutting forceps reducing the crista nasalis and projecting bony ridges after the cells have been opened by the small cutting forceps. The middle turbinal shown *in situ*. The dotted line shows the forward extent of the cribriform plate.

In 1899 Spiess¹ reported operations on eight cases, and availed himself of Röntgen ray screens in guiding his entry.

Experiments on the cadaver by Lichtwitz and Winckler² render it most doubtful whether in these reported cases the frontal sinuses were really penetrated. Both penetrated the cribriform plate in the course of their experiments on the cadaver. The same happened to Mermod,³ but unfortunately in a patient who died in consequence, and in whom *post-mortem* examination showed that the frontal sinuses were practically non-existent.

The intranasal method fell into disuse again for several years, until in 1905 it was revived by Fletcher-Ingals and Segura, with this essential difference—that they aimed at enlarging the natural frontal sinus ostium by removing or breaking down obstructing ethmoid cells and the projection of the *crista nasalis*, instead of making an entirely new and more medial opening at the anterior

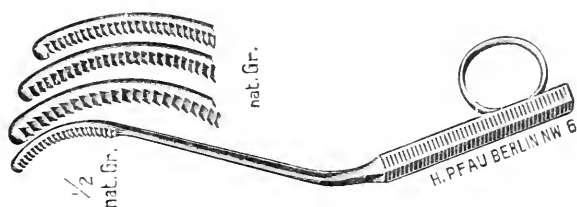


FIG. 1.—Sullivan's raspatories. (Vacher's are very similar.)

end of the olfactory fissure. In 1906, Halle,⁴ of Berlin, described his methods which he considered would overcome the inherent dangers of Ingals' operation, and more recently Good⁵ in 1907, Vacher,⁶ 1910, Segura,⁷ in 1912, Sullivan, Denis⁸ and others have severally advocated what they believe to be useful advances in technique.

It is necessary here to mention more in detail the essential features of these various methods, although the chief credit of bringing the intranasal method once more into the field of practical

¹ "Die endonasale Chirurgie des Sinus frontalis," *Arch. f. Laryng.*, Bd. ix, 1899.

² *Monatsch. f. Ohrenheilk.*, 1894.

³ *Ann. des Laryngol.*, 1896, and *Ann. des Mal. de l'Or.*, 1896.

⁴ "Externe oder interne Operation der Nebenhöhlenverengungen," *Berl. Med. Gesellsch.*, 1906, and later, *Arch. f. Laryng.*, Bd. xxiv, Heft 2.

⁵ *Journ. of Amer. Med. Assoc.*, 1907, vol. ii, p. 753.

⁶ *Comptes Rendus du Congrès de l'Assoc. Française de Chirurg.*, 1910.

⁷ *La Semana Med.*, 1912.

⁸ *Annal. des Mal. de l'Or. et du Larynx*, No. 6, 1912.

rhinology belongs to Fletcher Ingals, of Chicago, and next to him to Halle and Vacher.

Fletcher Ingals' instruments were exhibited at the Laryngological Society of London by Dr. Dundas Grant a few years ago. They consist essentially of a pilot, or frontal sinus probe, which, after a previous anterior middle turbinectomy, is passed into the frontal sinus through the duct and serves as a guide until it reaches the point of obstruction, when a burr is threaded over the pilot to make an open way to the sinus of the same diameter as the burr, viz. 6 mm. When the instruments are in position and current turned on the burr is gently pressed upwards and finally drawn forwards, and cuts its way into the frontal sinus in two or three seconds. With a packer he then introduces packing into the sinus, a strip of sterilised gauze, one inch wide, saturated with a 20 per cent. solution of zinc chloride. Finally a gold drainage-tube is slipped into the enlarged drainage canal, and the operation finished. The drainage-tube is retained automatically in position because it has a four-split end; this spreads on the solution of a gelatine capsule which keeps these spreading ends together when introduced—a most ingenious device. Fletcher Ingals' results in twenty-nine cases were cited in my previous introduction.¹ He has written a few days ago saying that he has operated on forty to fifty cases. One patient died from meningitis, Ingals believes due to too forcible injection of peroxide of hydrogen shortly after operation. Fletcher Ingals claims that the operation can be performed in 95 per cent. of all chronic cases, provided the anterior end of the middle turbinated body has been removed; that healing is rapid; and that the operation will leave as large a canal as desirable.

Max Halle introduces a probe as high as possible into the frontal cavity, and over the probe he slides a narrow protector of flexible metal which adjusts itself somewhat to the posterior wall of the sinus posteriorly. The probe is then removed and he advances with a bore drill along the front of the protector in a forward and upward direction, taking care to keep close to the protector, and in this manner with a sharp-ended drill he drills away the anterior ethmoid cells, and higher up the nasal crest. When he has entered the sinus he further burrs down the nasal crest with a blunt-pointed drill. In Halle's hands this method does not appear to have been attended with any untoward result, and he states it has always, when successful, made a very free entrance into the frontal sinus.

¹ *Trans. Roy. Soc., June, 1911, p. 5.*

Segura¹ has long advocated the intranasal operation, which he first performed early in 1905. His special instruments consist of a series of cutting sounds of different curve and thickness, flexible curettes which have their cutting edges in different directions, forwards, backwards, right and left. The cutting sounds are passed up the nasal duct, after previous removal of the anterior end of the middle turbinal, and, having been entered as far as they will readily go, they are pulled forward as they are withdrawn so as to curette away the fronto-ethmoidal cells and the nasal crest. After the fronto-nasal passage has been freed as much as possible,

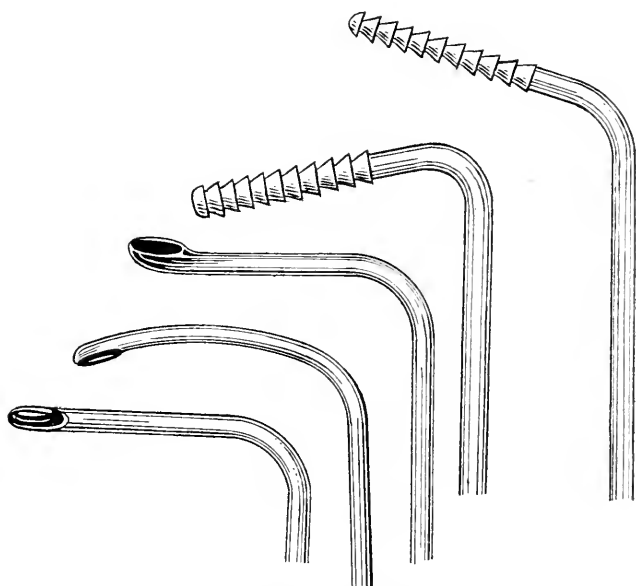


FIG. 2.—Two of Segura's raspatories and his three curettes, anterior, posterior and lateral, the other lateral curette being the same reversed.

the operation is finished by means of the cutting curettes, which further enlarge the canal in all directions, great care being taken when using the back-cutting curette. Segura states that he has operated in a large number of cases with uniformly good results, and in no case was there untoward result.

Others have used similar methods, notably Vacher and also Sullivan, who some few years ago used cutting sounds made safer by having a smooth posterior border very similar to those designed this year and shown at the last meeting of this Section by Mr.

¹ "The Treatment of Chronic Frontal Sinusitis by the Intra-Nasal Route"; read August, 1909, at the Latin American Congress; published in *La Semana Medica*, May 23, 1912.

Tilley and by myself (in the skiagram of a patient), this device, therefore, being by no means a new one.

Good uses chisels to cut away the nasal crest and wears down the remainder as far as possible by means of a sort of curette.

One realises, then, that much pioneer work has been done by those, to whom our thanks are due for initiating an operation which greatly enlarges the natural frontal sinus passage, as distinguished from the now abandoned operation of making *de novo* a new opening into the floor of the sinus through the roof of the olfactory fissure.

My own later methods of operation were due to a conviction that the methods of Ingals and Halle appeared too dangerous, while on the other hand, the more usual method of removing the anterior end of the middle turbinal, and clipping away the bulla and ethmoidal cells from the lower end of the fronto-nasal passage and thence working upwards, were ineffectual in such a large proportion of cases.

ANATOMICAL CONSIDERATIONS.

Examination of a number of skulls brings home the fact that clinically the ethmoid cells are not strictly confined to the ethmoid bone. The eminence of the agger on the upper part of the inner surface of the nasal process of the superior maxillary bone is usually cellular, hence the one or two most anterior cells correspond to the agger nasi, while the inner surface of the lachrymal and nasal bones close the anterior cells of the ethmoidal labyrinth which run in front of the fronto-nasal duct right up to the bony ring of the frontal sinus ostium in the internal angular process of the frontal bone. To avoid confusion we may speak of the groups of cells lying in front of the middle turbinal body as anti-conchal cells. The term "agger cells" (which are not always present) should be restricted as heretofore to cells in the agger.

The frontal sinus ostium is a bony ring bounded in the front by the posterior margin of the nasal crest. The nasal crest, projecting backwards, forms the sloping floor of the sinus in front of the ostium.

The vertical plate, the middle turbinate, descends from the under surface of the cribriform plate, which lies to its inner side above, and terminates below in a free convoluted margin in the middle turbinated bone. As the vertical plate forms the inner boundary of the anterior ethmoidal cells we tend to avoid risk of injury to the cribriform plate by retaining the vertical plate,

restricting all operative measures to its outer side. But it is worthy of note that the cribriform plate does not extend forward beyond the *tabula interna*, and that the anterior border of the middle turbinal body is in front of the anterior end of the cribriform. The outer boundary of the ethmoidal labyrinth in this region is formed by the lachrymal bone. The width of the potential passage between the inner and outer boundaries varies with the development of the intervening cells, but in its narrowest part corresponding approximately with the level of the inner

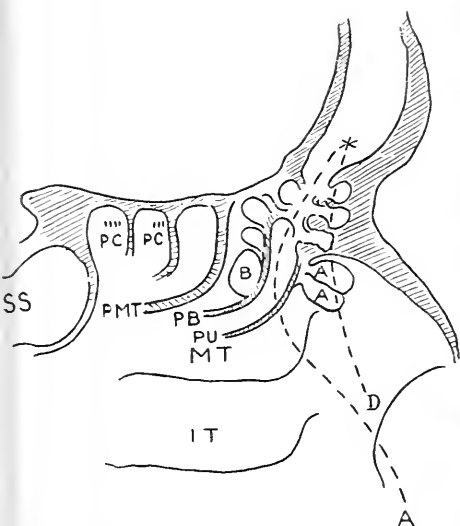


FIG. 3.—Diagram of the ethmoidal labyrinth and fronto-ethmoidal cells, showing the curved entry A to * of the old method of catheterisation of the frontal sinns, as compared with the direct anterior method of entry advocated, D to *, i.e. the creation of a new artificial fronto-nasal passage. AA, agger cells; PU, plate of the uncinate process; PB, plate of the bulla; B; PBT, plate of the middle concha; PC''' and PC''' plates of the concha superior and concha suprema.



FIG. 4.—Bone specimen showing the fronto-nasal passage with probe passing through; the dotted line shows the route of anterior entry through agger and other anti-conchal cells. Note the "anterior entry" is well in front of the cribriform plate.

canthus. I find it measures in the adult from 7 to 12 mm. (and this coincides with a number of measurements made by my Clinical Assistant, Mr. Harty), and therefore the width of an instrument intended to clear the space of obstructive cells should not exceed 6 mm., while in some patients it must be less or it will pierce the orbital wall.

It was necessary also to consider the relations of the lachrymal

sac and canal to the operative tract. The lachrymal duct lies below the operation field, but the lower level of the sac corresponds to the agger nasi, and the upper limit of the *sinus lachrymalis* often reaches the level of the cribriform plate or to the thick upper end of the nasal bone at its junction with the *crista nasalis* of the frontal bone. Hence it seemed better to use blunt-nosed forceps to clip away the projecting walls of anti-conchal cells.

In patients whose fronto-nasal passage is obstructed we may throw all the fronto-ethmoidal as well as the agger cells into one, thereby creating a direct opening to the frontal sinus ostium above and in front of the middle turbinal. It is surprising how free and large an approach to the frontal sinus ostium is at once obtained in this usually simple manner, and if the frontal sinus ostium is too small, it may then be safely enlarged towards the front by partial removal of the nasal crest by fine burrs rather than by chisels, which would more readily enter the orbit, besides introducing a source of grave danger to a low-lying posterior frontal sinus wall.

THE AUTHOR'S OPERATION.

It is assumed that the extent and depth of the frontal sinuses have been determined by skiagrams prior to operation.

The operation based on these anatomical data, which is not any more painful than a submucous resection of the septum and takes less time, is performed under either local or general anæsthesia with small cutting forceps, burrs or rasps in the following manner:

(1) With small angular ethmoidal forceps engage the anterior margin of the middle turbinal at its point of attachment to the outer nasal wall. Cutting through this the forceps enter the anterior ethmoidal cells in front of the fronto-nasal passage.

(2) Keeping to the outer side of the vertical plate of the ethmoid, clip away all the agger cells and the other anti-conchal cells right up to the nasal crest.

(3) The anterior ethmoid cells lying behind or above the fronto-nasal duct are now removed by the forceps. One can readily clip the cells as far back as may be necessary in any particular case, from the bulla to the sphenoidal sinus, without anterior turbinectomy.

(4) Using the larger forceps, the thicker projecting partitions of the cells are punched away. Only the blunt tip of the female blade can come into contact with the roof.

(5) The bougies are then passed into the sinus, so as to gauge

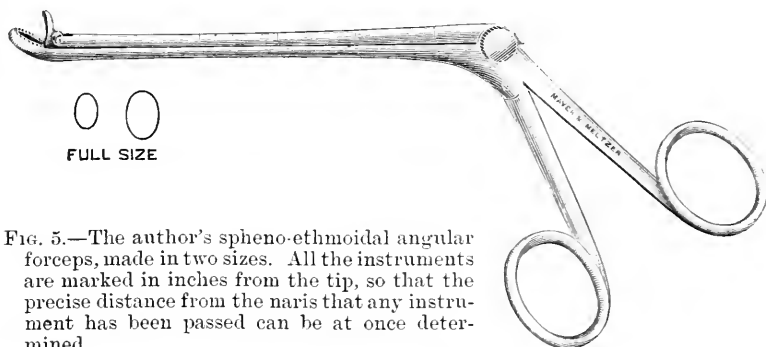


FIG. 5.—The author's spheno-ethmoidal angular forceps, made in two sizes. All the instruments are marked in inches from the tip, so that the precise distance from the nares that any instrument has been passed can be at once determined.

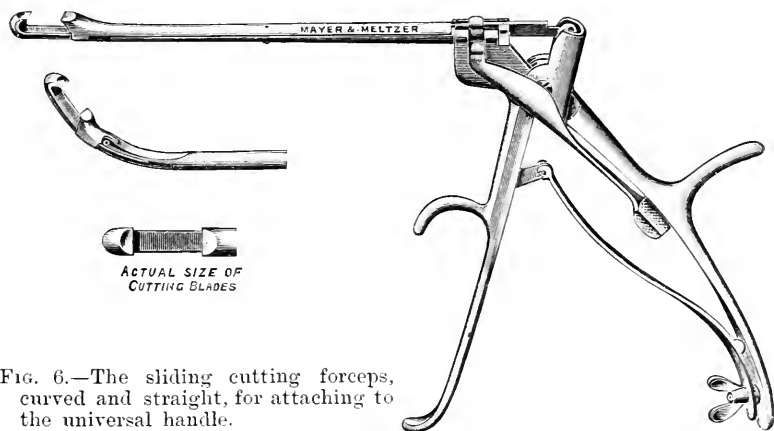


FIG. 6.—The sliding cutting forceps, curved and straight, for attaching to the universal handle.

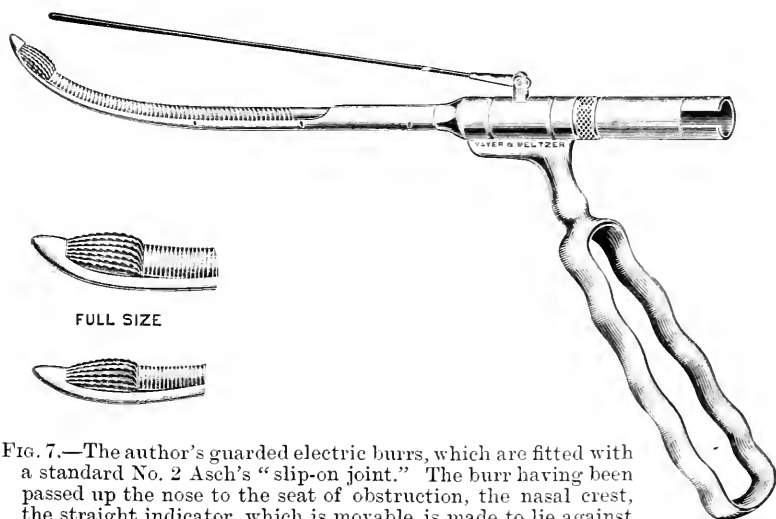


FIG. 7.—The author's guarded electric burrs, which are fitted with a standard No. 2 Asch's "slip-on joint." The burr having been passed up the nose to the seat of obstruction, the nasal crest, the straight indicator, which is movable, is made to lie against the face outside and its tip indicates the position of the burr *in situ*.

the size of the fronto-nasal channel thus formed. Usually Nos. 18 or 19 will enter, sometimes 19-23, or 19-25. (The figures give the circumference in millimetres, hence, No. 19 has a diameter of 6 mm., or $\frac{1}{4}$ inch. A 19-25 bougie measures 6 mm. in width and 8 in antero-posterior diameter.) If such a large bougie will not enter, the bone corresponding to the nasal crest may be shaved away by the sliding cutting forceps till these large sizes can be introduced, or the crest reduced first by the smaller guarded burr, or a small-sized sharp raspatory, till the passage admits the burr or forceps. When a No. 10 enters the sinus the bony boss can be burred away with the 4 mm. guarded burr until it enters the sinus, when it is made to burr the crest from above downwards.

When the frontal sinus opening lies well to the outer side and tends to guide entering probes towards the orbital roof, unless

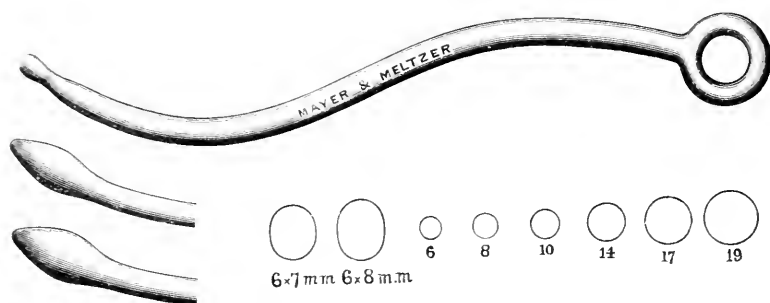


FIG. 8.—The author's frontal sinus bougies, two thirds actual size; above, the round bougie, below, the swan-head ends. The sectional area of different sizes are also shown. Assuming the normal fronto-nasal duct to be 2 mm. wide, the passage of a 6 by 8 mm. bougie shows that the duct has been enlarged twelve times.

contra-indicated by skiagrams it is well to draw the strong forceps or burr towards the front so as to enlarge the frontal ostium to the front and inwards rather than towards the orbital roof outwards.

(6) With the small forceps which now enter freely, the projecting walls of any ethmoid cells which remain may be clipped away to render the passage more free.

(7) The sinus is well lavaged at this stage, and, finally the anterior end of the middle turbinal *may* be removed, as when it is left intact the channel may be narrowed by subsequent granulations. Particularly with acute infection it may be safer to defer removing any part of the middle turbinal for a few days till lavage has partly sterilised the sinus.

The extent of the operation, which may be completed at one sitting or in two or three stages, varies with the clinical conditions

PLATE II.



FIG. 1.—Skiagram showing 6 mm. thick round bougie entering frontal sinus, but carried back so as to impinge against tabula interna because the nasal crest is thick.



FIG. 2.—The same case, but showing the 6 mm. (No. 19 French scale) bougie entering well into the sinus after reduction of the nasal crest by burring.

Skiagrams showing Watson-Williams's swan-head bougie, 8 mm. by 6 mm., entering the frontal sinus after removal of crista nasalis.



FIG. 3.—Case of W. C.—. Lateral view left frontal sinus and swan-head bougie.



FIG. 4.—The same, antero-posterior aspect. The skiagram shows the right sinus healthy, the left sinus containing the bougie being diseased. (Skiagram reversed in print.)

TO ILLUSTRATE DR. P. WATSON-WILLIAMS'S PAPER ON INTRANASAL OPERATION FOR FRONTAL SINUS SUPPURATION.

requiring relief, which determine whether the crista nasalis should or should not be reduced. In the majority of my cases I have not found it necessary to reduce the nasal crest by rasp or burr, the simple removal of the fronto-ethmoidal cells, and in some cases biting off a thin projecting anterior margin of the ostium, affording easy passage to a 6 mm. or at least a 4 mm. thick bougie. This relatively simple procedure one may term the *partial operation*, as compared with the *complete intranasal operation*, which involves reduction of the crista nasalis by burring or other means. The complete operation is desirable when with a large sinus there is reason to believe polypoid degeneration of the mucosa exists or when the partial operation fails to afford permanent relief, or when the simple removal of the fronto-ethmoidal cells leaves such a narrow entry that a larger artificial duct is required.

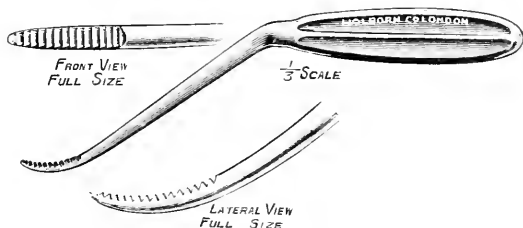


FIG. 9.—The author's small raspatory. At the tip it measures only 2 mm. in width, and it can only cut forwards; the end also is blunt.

A. EXAMPLE OF INCOMPLETE INTRANASAL OPERATION WITHOUT REMOVAL OF NASAL CREST.

F. B. : Example of Subacute Case with Nose too Narrow for Inspection of Operatic Field; Operation at One Sitting; General Anæsthesia.—On January 15, 1914, was seen in consultation with Dr. Visger for mastoiditis with view to operation. Symptoms of acute mastoiditis of two weeks' duration. Had suffered from right supra-orbital neuralgia during December, 1913. Pus seen in the middle meatus, far back, at times cacosmia. Right antral exploration with suction syringe yielded pus. Skiagram showed right frontal sinus blurred.

Right antral intranasal operation, with partial removal of posterior border of nasal process as it encroached on and narrowed the nasal passage. Anterior entry of frontal sinus by removal of fronto-ethmoidal cells enabled a 6 mm. bougie to enter freely.

Antral Pus Film.—G.P. streptococci; some phagocytosis injected. Culture: G.P. streptococci, no staphylococci. At time of

operation 50 c.c. of anti-streptococcic serum, followed by sensitised streptococcal autogenous vaccines; dosage, 75 million up to 450 million.

Discharge almost ceased. No headaches since operation.

B. EXAMPLE OF COMPLETE OPERATION WITH REMOVAL OF NASAL CREST.

Case of Left Frontal Sinus Suppuration, etc.—Chronic frontal sinus suppuration. Operatic field in view. Intra-nasal frontal sinus operations under cocaine: (1) Anterior entry by removal of fronto-ethmoidal cells; (2) Burring of crista nasalis. Admitted bougie 8 mm. thick antero-posteriorly and 6 mm. wide.

W. C—, aged thirty. Subject to left supra-orbital headaches for many years, but two years ago they became very severe, and then were relieved by discharge of pus. Recurrences ever since, usually once a week or so. His left antrum was opened and drained in 1912.

On March 16, 1914, nothing larger than a 2 mm. cannula would enter his left frontal sinus. Anterior entry and removal of fronto-ethmoidal cells allowed admission of a No. 19 (6 mm.) bougie.

On March 18 the crista nasalis burred, so that a No. 19–25 bougie entered (= 8 mm. by 6 mm.). No headaches since the operations on the frontal sinus, both under cocaine anæsthesia, and, the patient states, were painless. Since the operation slight curettage of sinus, lavage and injection of collusol argentum. Complete absence of headaches since operation (see Plate II, figs. 3 and 4).

One advantage that may be claimed for this method of entry as compared with methods with unguarded burrs is that the mucous membrane is not stripped from the posterior and lateral walls of the new passage, for although the cell partitions are clipped away, the mucous membrane of the cell bottom is mostly retained. Only anteriorly is the bone laid bare and that for a strip about 6.5 mm. wide, and this can apparently re-cover itself by extension from the muco-periosteum on either side. Is it not better to have a 6 or 7 mm. wide passage which is lined with mucons membrane than a wider one which can only granulate over and which is much more liable to subsequent contraction?

A septal deflection, unless so pronounced and so situated that it is impossible to reach the operative field, should be left to be dealt with when the infected sinuses have recovered or are more healthy;

PLATE III.



FIG. 1.—Skiagram of patient. Large bougies in both frontal sinuses.



FIG. 2.—Skiagram of patient with endorhinoscope passed into frontal sinus.



FIG. 3.—Skiagram showing the 4 mm. wide guarded electric burr reducing the crista nasalis in a patient.



FIG. 4.—Skiagram of patient showing 6 mm. burr on nasal crest.

TO ILLUSTRATE DR. P. WATSON-WILLIAMS'S PAPER ON INTRANASAL OPERATION FOR FRONTAL SINUS SUPPURATION.

if necessary the septum can be pushed over to the other side by a Killian speculum. I have operated successfully on a frontal sinus when a septal deflection concealed from sight the middle turbinal and every part of the operative field.

After-treatment consists—

(1) In lavage of the sinus, first with saline solutions and weak peroxide of hydrogen and some mild antiseptic, such as colloidal or other silver preparations, iodine solutions and so forth, and later with stronger solutions if necessary.

(2) In the passage of the largest bougie the canal will take comfortably, repeated at short intervals to prevent adhesions and to ensure the passage remaining widely open until the sinus has become healthier, or the discharges disappear.

(3) The use of vaccines, etc., has to be considered. But in cases of streptococcal infection it is always safer to give 30 to 50 c.c. of polyvalent anti-streptococcic serum immediately before operating and follow with sensitised vaccines.



FIG. 10.—The author's flexible metal frontal sinus cannula.

(4) I prefer not to use a drainage-tube, and to avoid all packing of the sinus. Occasionally a small flexible curette may be used for the sinus to remove polypoid mucous membrane.

If a sufficiently wide fronto-nasal passage to admit a bougie 15 mm. in circumference is obtained without cutting away the thick part of the nasal crest, and the sinus infection is recent or there is no reason to believe that polypoid degeneration of the mucosal lining has occurred, I do not use a burr or other means for cutting away any part of the floor of the sinus unless subsequent observation seemed to render this desirable. (Provided efficient drainage is maintained, and the patient has been relieved of pain, headache and inconvenient discharge, only the lesser operative measures are performed.)

As regards results, statistics are, I think, of no value unless details of the history, symptoms, complications are given as well as a description of the anatomical conditions encountered. In some cases of long standing frontal sinus suppuration, with polypoid degeneration of the mucosa, and particularly in cases where extensive polypus formation in the region of the unciform process co-exists,

the fronto-nasal passage is altogether abnormally large and no symptoms beyond discharge may be present. Between these excessively large ducts, and the very small tortuous channels, which are particularly prone to determine the occurrence of an acute or chronic frontal sinusitis, there is every degree of relative obstruction to the drainage of the sinus secretions. The co-existence of other sinus suppurations will also largely influence the results obtained by establishing good frontal drainage. But apart from such factors, which are largely under control by intranasal operations, the anatomical arrangement of the ethmoidal cells in relation to the frontal sinus and its exit, and the size and extent of the sinus itself, must often render it impossible to obtain satisfactory result even though a large direct fronto-nasal passage can be made or already exists.

I find that in my hospital clinic and in private fifty-one cases have been operated on by the anterior method of entry described. One patient died, and though death could not have been in any way due to the frontal sinus operation, it must be mentioned. In three cases external operation had to be performed in consequence of the failure to obtain relief by intranasal methods. In a considerable percentage an apparent cure resulted (in eleven out of twenty-two private cases that I can trace); in others relief has been such as to negative any question of an external operation. At least some of those cured would doubtless have been cured by the older method of intranasal lavage after removing the anterior end of the middle turbinal, etc. But there is no doubt in my mind that many of the cases completely relieved would have required external operation if efficient drainage had not been obtained by the method of intranasal operation such as I have described.

The patient who died was admitted to the Royal Infirmary with an external fistula leading to a suppurating right sinus of several years' duration and much broken in health. I found he had double antral suppuration and polypi in each middle meatus on both sides. The anterior ethmoidal cells were opened, including the anti-conchal cells, the crest reduced by a rasp, and a double intranasal antral operation performed. The frontal sinuses admitted a No. 19 bougie very freely. I avoided exploring the sphenoidal sinuses as there were no symptoms pointing to them, for with such extensive opening up the other sinuses I wished to avoid increasing the operative field after a double intranasal antral sinus operation. The patient died eight days later from general septicæmia. "There was a large area of cellulitis in the left leg . . . Meningitis was not found either at the frontal area or over the cortex. On opening up the sinuses, the right sphenoidal and right frontal sinuses contained muco-pus. The left frontal sinus was free from pus. . . . The bone in the fronto-nasal region did not show any sign of inflammatory exudate the diploë appearing normal. There was not any evidence of thrombosed veins. The entry of the organisms must have taken place through other channels than these" (from report of autopsy, by Prof. Walter Hall).

I would here emphasise two points to be borne in mind :

(a) While a very large percentage of frontal sinuses are easy to enter and to drain, it is just the remaining small percentage (in which the anatomical conditions make it both difficult for the discharges to drain and for the operator to effect drainage) which test the merits of any operative measure and its efficiency in overcoming the difficult conditions in which other and perhaps simpler procedures cannot suffice.

(b) External operation has proved very successful in curing frontal sinus suppuration without cosmetic deformity when the sinuses are small, and do not favour such large and free intranasal entry as the more fully developed sinuses. With small sinuses there is less reason to avoid external operation, and therefore when efficient intranasal drainage is difficult to obtain, there is less reason to avoid the more radical external operation, and less excuse for exposing the patient to risks from intranasal operation. While there is no room to doubt that skiagraphy has proved of very great assistance in determining before operation the size and disposition of the frontal sinus, and its relationships in any particular patient, to foretell the position of the sinus septum and so forth, we further may thereby derive information which enables us to foretell that external operation is likely to leave much cosmetic deformity or otherwise. In the former class a patient may hesitate to undergo external operation, even when intranasal methods have left him but partially relieved, when, if his sinuses were small, he might be well advised to have a radical external operation. It is sometimes safer to do an external operation than to persist in intranasal methods in a wholly unsuitable case.

Mosher, whose recent laborious researches on the applied anatomy of the frontal sinus and fronto-ethmoidal cells deserve our fullest recognition and thanks, has emphasised the clinical importance of the agger cells, and has devised a routine method for catheterising the frontal sinus and exenterating the anterior ethmoidal cells. He states that "the point of attack is the agger nasi cell, if it is present and its mound can be recognised; if not the upper part of the anterior end of the middle turbinate. The external guide is the inner canthus of the eye. . . . A mastoid curette with a long handle and a bowl about half a centimetre wide is the most convenient instrument to work with. Having located the mound of the agger nasi cells, or, if it is not present, having brought into view the anterior end of the middle turbinate, the curette is pushed upward into the olfactory cleft with the cutting edge outward and

aimed and then pressed toward the lachrymal bone. If the curette is in the right place it easily enters the ethmoidal labyrinth. The curette has an allowable excursion varying with the labyrinth of a half a centimetre to a centimetre and a half. If the curette is carried too far it enters the orbit. . . . After the initial outward plunge the handle of the curette is brought into the line with the antero-posterior axis of the labyrinth. With the bowl up and the cutting edge downwards, the curette is carried backward and downward until the bulla has been entered and destroyed. This means a backward excursion of half an inch. . . . The loose part of the middle turbinates is now cut off with a conchotome.

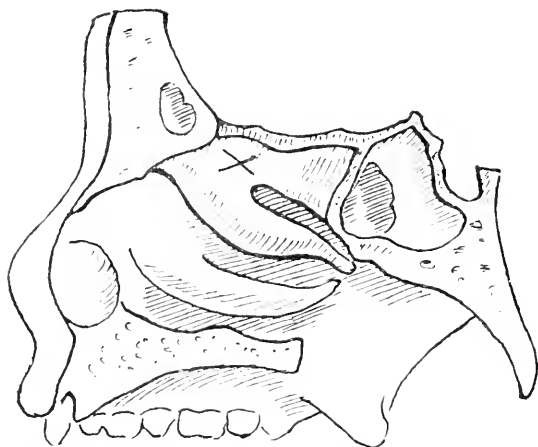


FIG. 11.—Traced from Moshier's diagram to show X, the point at which the curette is carried into the ethmoidal labyrinth.

"The cutting surface of the curette is now turned forwards and a little outward and brought forward until the flint-like posterior edge of the superior maxilla is encountered."¹

Since writing my paper, by the courtesy of Max Halle I am enabled to place before you his recently modified operative method, hitherto unpublished, and the fact that he has felt it desirable to improve on his published methods so as to render it more free from danger shows that he realises the risks of his previous operation. The following paragraphs are translations from Dr. Halle's letter to me.

"The method formerly proposed by me I still think good, but I have greatly improved the procedure. It has, up to now, not been made public.

¹ *Laryngoscope*, September, 1913, p. 13.

"An incision is made through the mucosa and periosteum on the agger nasi, immediately in front of the middle turbinal, beginning as high up as possible and descending along the frontal edge of the turbinal to end in the middle meatus close to the head of the inferior turbinal. From the upper end of the incision the cut is carried by the lateral nasal wall as far as the nasal bridge, and thence descending in a curve to end in the vicinity of the upper edge of the inferior turbinal. The resulting flap is detached from above downwards and is turned back and held by a small pledget under the middle turbinal. Now the edge of the middle turbinal is detached and after that the agger narium is chiselled away. One may chisel laterally rather far without the least danger.

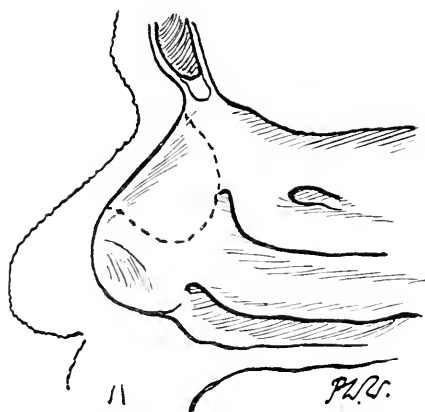


FIG. 12.—Diagram showing muco-periosteal flap employed by the author.

In this way the foremost ethmoid cells are laid bare; the ethmoid bone is now cleaned with suitable instruments. By this process one can, anyhow in all suitable cases examined by me up to now, introduce a probe into the frontal cavity with the greatest safety. This is—I always lay great stress on the point—the preliminary condition for intranasal operation, should the opening already obtained not suffice. In the latter circumstances the opening admits my smallest pear-shaped burr with blunt, rounded top; it only cuts when led downwards. The floor of the frontal sinus is now burred away, first with small and then with larger burrs. The cavity is exposed widely, and one can not only see into it, but probe it thoroughly, and, if necessary, remove the diseased mucosa entirely with my sharp, pliable spoons. The great advantage of the present method is that one can avoid the sharp burrs before used, and which had to be covered with a protector to force a way into the

cavity. At the end of the operation the flap is laid into the deeply created cavity of the lateral wall. I have up to now operated in forty-eight cases in the old and the new method and I have not been unsuccessful in any single instance."

I feel bound to say that in my hands my own method of exenteration would be easier to perform, and, I think, safer than Mosher's or Halle's. With an infective purulent discharge, we should avoid opening up a bare tract so close to the cribriform plate, and I always keep intact the upper part of the vertical plate, which is the first part that Mosher destroys.

I have as an outcome of Halle's flap quite lately tried making a flap of muco-periosteum. By making an incision at the highest point one could reach above the point of attachment of the middle turbinal, carrying the incision down in front of the middle turbinal to the level of its lower margin, then straight forwards and upwards to end below and in front of the agger nasi, the resulting flap being detached and held against the septum until the end of the operation, when it should be replaced. There was no difficulty in getting it to re-unite *in situ*, but I think it offers no advantage, as of the whole operative field, the agger nasi is the only denuded area which the flap can re-cover, and if the agger cells are non-existent and therefore not opened, the flap is worse than useless, except in cases where it is necessary to shave down an inward projecting posterior edge of the nasal process of the superior maxilla.

THE INTRANASAL TREATMENT OF EMPYEMA OF THE FRONTAL SINUS.¹

BY HERBERT TILLEY, B.S., F.R.C.S.,

Surgeon, Ear and Throat Department, University College Hospital, London.

ACUTE EMPYEMA.

THERE will be little difference of opinion amongst us as to the principles which should be followed in the treatment of acute suppuration in the frontal sinns.

We know that the vast majority of cases get well without any local treatment, and that this happy result is due to the fact that

¹ Introduction to discussion on the Intranasal Treatment of Frontal Sinus Suppuration at the Laryngological Section, Royal Society of Medicine, April 3, 1914.

the anatomical disposition of the sinus is such that efficient drainage of the inflammatory products is provided for in an ideal manner, *i. e.* from the lowest point of the inflamed abscess-cavity.

When conditions are present which impede such drainage, symptoms of retention will appear, and our efforts will be directed to the establishment of a free outflow from the sinus.

Amongst the factors which commonly lead to retention of inflammatory products we may mention :

(a) Great swelling of the mucous membrane of the nasal cavity, which is shared by that of the fronto-nasal duct and of the mucous membrane lining the middle meatus, which in this situation may be in the nature of acute oedema—a fact due to the loose sub-epithelial tissue in the concavity of the middle turbinal. Such acute congestion is often seen when the inflammation is due to influenzal infection.

(b) An abnormal swelling of the anterior end of the middle turbinal, which is wedged in between the septum and the anterior region of the lateral mass of the ethmoid, wherein is situated the lower end of the fronto-nasal canal.

(c) A deviation of the upper part of the nasal septum, by pressing outwards an otherwise normal middle turbinal, will induce a similar result.

(d) The obstruction may be found in the fronto-nasal canal itself in the form of an anterior ethmoidal cell, which, extending upwards, encroaches on the floor of the frontal sinus and makes a serious inroad on the patency of the fronto-nasal canal. Such a cell is known as the "frontal bulla."

These do not exhaust the conditions which may obstruct free drainage, but they are among the commonest factors.

Our treatment must be directed to the establishment of free and spontaneous drainage.

To this end the patient should be kept in bed in a warm room, and drainage will be promoted if the head and shoulders are slightly raised on a pillow.

The bowels should be opened by 2-3 grm. of calomel and followed by a saline aperient. After the initial action I think $\frac{1}{6}$ gr. of calomel every two hours for the first three days is a useful treatment.

Ten- to 15-gr. doses of aspirin three or four times daily is probably the best internal remedy when influenza or an acute coryza is the underlying constitutional disease.

To relieve congestion of the mucosa in the region of the middle

meatus we must rely on the application of cocaine and adrenalin. Equal parts of a 20 per cent. solution of the former and a 1 in 1000 solution of adrenalin chloride will be found of sufficient strength, and it should be carefully applied on a wool mop every two hours for the first day or two, or until the symptoms of retention show signs of subsidence.

If care be taken only to apply small quantities to the anterior part of the middle meatus, there need be little fear of cocaine poisoning.

Scarification of the anterior end of the middle turbinal with its attendant blood-letting is excellent practice in cases where the mucous membranes are very much swollen.

An attempt should always be made to pass a fine cannula into the sinus and wash out any inflammatory products with warm normal saline solution or boracic lotion. Last year I was able to do this in a child, aged nine, with great relief to the supra-orbital pain, and the irrigation was followed by a rapid fall of temperature from 102° to 99.6° F.

When a case admits of irrigation the cure is usually rapid and complete.

On the other hand, when acute symptoms of retention persist and it is difficult or impossible to make applications of the cocaine mixture to the middle meatus because of enlargement of the middle turbinal, this structure should be removed together with any obstructing anterior ethmoidal cells and the aforementioned treatment carried out. I have seen œdema of the upper eyelid associated with acute tenderness of the anterior wall of the sinus completely subside after removal of the middle turbinal and application of cocaine and adrenalin to the anterior region of the middle meatus.

I have not had much experience of Sondermann's suction apparatus in the treatment of acute sinus inflammation, but it may be tried, or failing it an efficient exhaust may be made by means of a Politzer's bag.

I have never used a Brünings' light head-bath for the head, but have found great relief from hot fomentations applied over the lower forehead.

When acute symptoms persist in spite of the above measures, and especially when swelling and œdema appear in the eyelid and in the soft tissues over the sinus, external operation will be called for, because it is more than probable that there is a collection of pus under the periosteum.

CHRONIC EMPYEMA.

The history of the surgery of the frontal sinus has proved to be no exception to the rule which has marked the progress of most surgical discoveries and innovations. First comes the discovery of a new area with its associated pathological conditions previously unrecognised or little understood, and with this clearer recognition there is gained the clue to symptoms and clinical signs hitherto unintelligible or misinterpreted.

Radical measures are adopted, and very soon a series of successful cases are reported by the pioneers in this new territory of human frailty. An inrush of enthusiastic workers follows, and claims are pegged out in the name of this or that surgeon who devises an operation, or more often modifies that of his fellow worker. The pace is fast and furious but soon the inevitable fatal cases occur, or the after-results are not all that was promised or desired, and by mutual consent a halt is called, breathing time is asked for, and we look around to take stock of our position. During this pause there are those who wonder if, after all, it is not possible to secure the well-being and happiness of the patients by measures which shall entail less suffering and less risk to life as well as a diminution of anxiety on the part of the surgeon.

I think, Sir, that this is our position to-day—that we meet to discuss whether it is not possible in these times of fuller knowledge and ripèr experience “to make the punishment fit the crime,” and I esteem it a great compliment that the Council has asked me—I fear one of the radical pioneers in the surgery of the frontal sinus—to share in opening this discussion.

ANATOMICAL CONSIDERATIONS.

There can be few regions in the body where the difference between the success or failure of surgical interference, or, indeed, the very life of the patient, depends more on an intimate and practical knowledge of anatomy than it does in the region of the ethmoid bone which borders so closely on important and vital structures.

For this reason I propose to point out the main anatomical features met with in the region of the anterior ethmoidal labyrinth and its relation to the frontal sinus, the cribriform plate and the orbit. These relationships will be demonstrated by photographs which have been taken from specimens prepared by myself and

from illustrations selected from the works of Logan Turner, Beaman Douglass, Mosher, Onodi and others. To Mosher, of Boston (U.S.A.), I am especially indebted, and would refer you to his excellent monograph, "The Applied Anatomy and Intra-nasal Surgery of the Ethmoidal Labyrinth," *Laryngoscope*, September, 1913.

The superficial features of the outer wall of the nasal fossa are

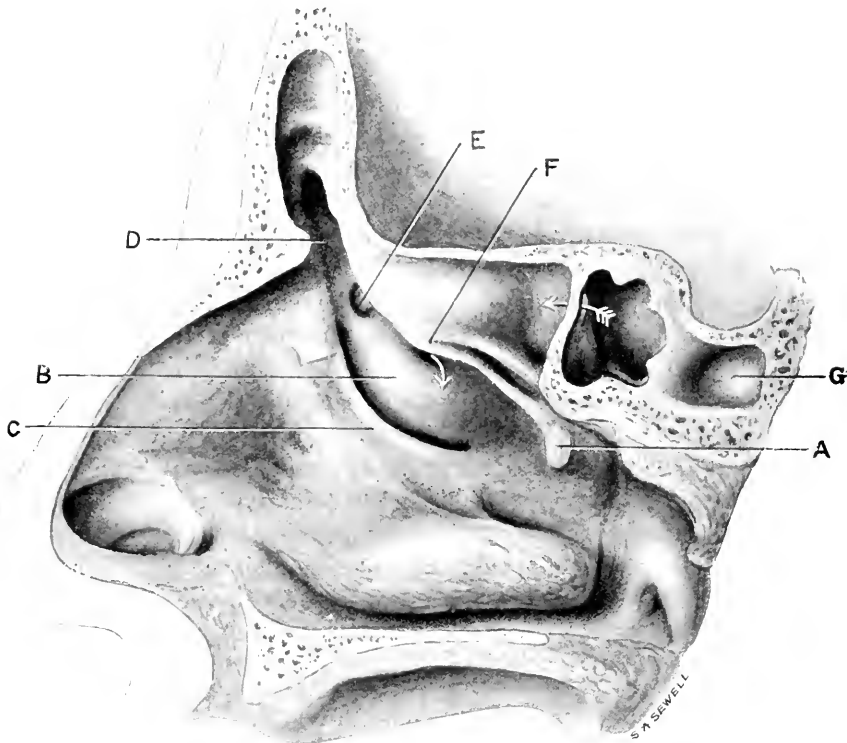


FIG. 1.—A. Posterior cut end of middle turbinal. B. Ethmoidal bulla. C. Uncinate process of ethmoid. D. Frontal sinus. E. Opening of an anterior ethmoidal cell. F. Opening of ethmoidal bulla. G. Extension of left sphenoidal sinus behind right sinus. (From specimen dissected by author.)

familiar to you all, viz. the superior, middle and inferior turbinal bodies.

If the middle turbinal is removed, two structures immediately call for notice (Fig. 1).

(1) The *ethmoidal bulla*, the largest of the anterior ethmoid cells. Its lower convex border lies in the concavity of the hiatus semilunaris.

(2) The hiatus semilunaris, a curvilinear depression bounded above by the ethmoidal bulla and below by the edge of the uncinate process of the ethmoid.

The hiatus is the communication between the middle meatus and the "infundibulum."

The "infundibulum" is the curved gutter-like channel on the outer wall of the middle meatus bounded above by the bulla ethmoidalis, and below and internally by the outer surface of the uncinate process.

It may terminate anteriorly and superiorly in one of two ways:

(1) By ending blindly in an ethmoidal cell.

(2) By being continued upwards into the fronto-nasal duct.

The "*fronto-nasal duct*" is the canal or passage which leads from the infundibulum, or from the middle meatus into the frontal sinus.

Mosher says that in 25 per cent. of the skulls he examined the fronto-nasal canal was continuous with the infundibulum, while in 50 per cent. it opened freely (*i. e.* independently of the infundibulum) into the middle meatus.

You are aware that the cells composing the ethmoidal labyrinth are divided into an anterior and posterior group by a thin diagonally placed plate of bone, which is limited externally by the os planum of the ethmoid, and internally projects into the nasal cavity and forms the middle turbinal body. Each true cell has an opening of its own, and those cells which belong to the anterior group open into the middle meatus, while those of the posterior group open into the superior meatus.

The cells in each group vary in number, and we shall not be far wrong if we say that the anterior may number from three to seven and the posterior from one to four. As a rule the anterior cells are smaller than the posterior, and their openings are in the region of the hiatus semilunaris and infundibulum.

May I remind you of the great variations which may be met with in the size, structure and situation of the ethmoidal cells. It will only be necessary to refer to the most important of them.

(1) The "*bulla frontalis*" is an anterior ethmoidal cell which projects upwards and anteriorly into the floor of the frontal sinus, and is a frequent cause of obstruction to the catheterisation of the frontal sinus.

Sometimes these cells are found in front and to the inside of the fronto-nasal duct and end beneath the intersinus septum, thus producing a bulging outwards of the lower part of the septum.

(2) The "*cell of the agger nasi*" (Figs. 2 and 3) is a cell (sometimes two or three) often developed in the anterior and upper third of the uncinate process, and frequently proves the main obstacle to probing the frontal sinus.

We are indebted to Mosher for pointing out the importance of removing this cell in order to gain free access to the frontal sinus and to the anterior cells of the lateral mass.

This agger cell "is covered by the anterior attachment to the middle turbinal where this bridges across the upper part of the unciform groove" (Mosher, *loc. cit.*) (Fig. 3).

(3) *Fronto-ethmoidal cells*, which extend outwards for a varying distance between the roof of the orbit and the frontal sinus.

(4 and 5) It is unnecessary to do more than mention the presence of *maxillo-ethmoidal* and *spheno-ethmoidal cells*, because they scarcely come within the purview of this discussion.

The "*ostium*" of the frontal sinus is a narrow communication of the frontal sinns with either—

(a) The nose directly, when it opens in the upper anterior portion of the middle meatus.

(b) The upper end of the fronto-nasal duct when this opens into the infundibulum.

Its normal position is below the level of the cribriform plate, and it may be displaced mesially towards the cribriform plate, laterally towards the orbital plate of the frontal bone, anteriorly towards the nasion, or so far posteriorly that it is close to the posterior wall of the frontal sinus.¹

Danger would be encountered in the intranasal operation if the ostium were small, or if it were situated near the sagittal plane and at a higher level than the cribriform plate.

GENERAL CONSIDERATIONS.

It is obvious that if the intranasal method of treating chronic frontal sinus suppuration is to partially supplant the external operation, it must conform to certain elementary principles which underlie the treatment of similar conditions in other bony-walled cavities. Briefly these principles are:

(1) Provision must be made for free, spontaneous and permanent drainage.

(2) The removal of pyogenic membrane and foci of infection.

¹ Gordon Wilson, *Trans. Amer. Laryng. Soc.*, 1908, p. 178.

PLATE I.

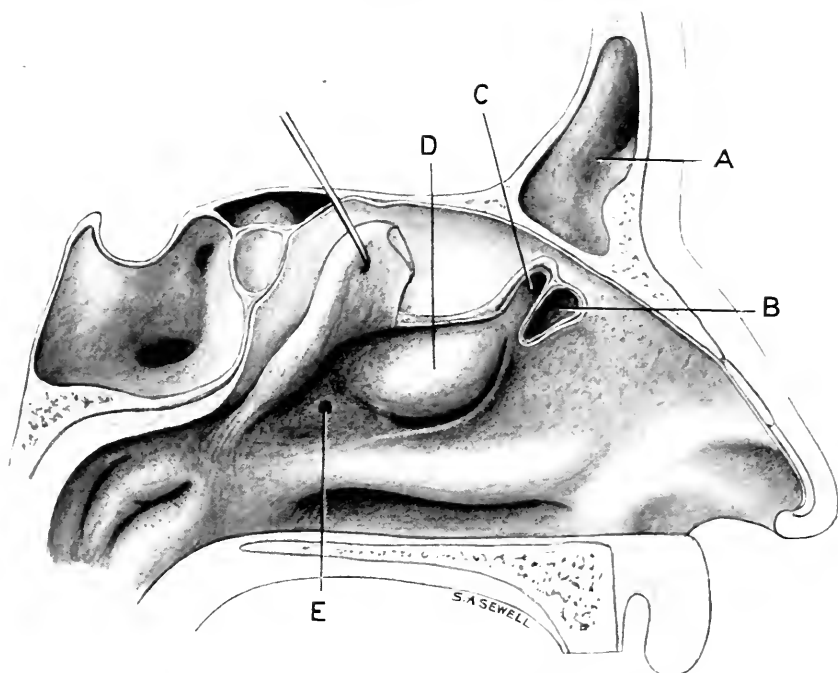


FIG. 2.—A. Frontal sinus. B. "Agger" cell. C. Fronto-nasal canal. D. Large ethmoidal bulla. E. Accessory antral "ostium." (From specimen dissected by author.)

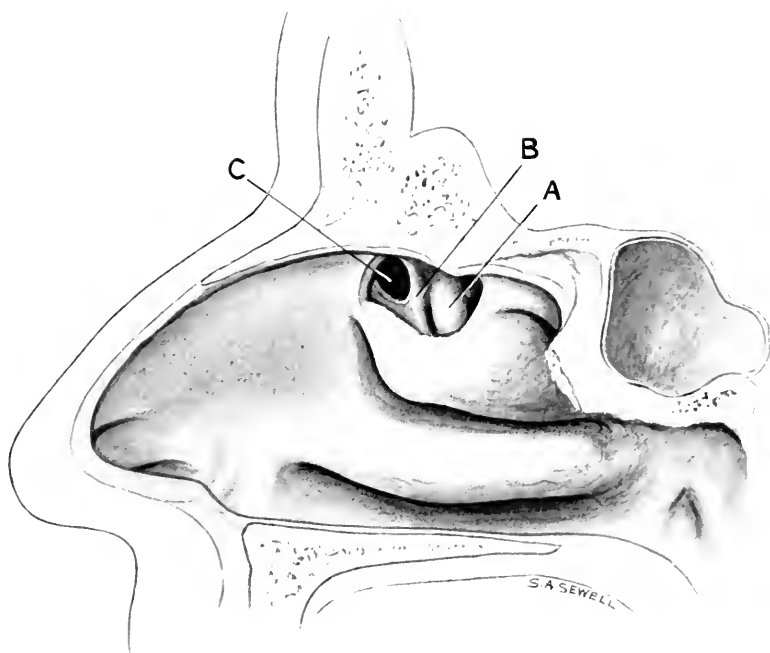


FIG. 3.—A. Upper portion of ethmoidal bulla. B. Upper end uncinate process. C. "Agger" cell. (From specimen dissected by author.)

TO ILLUSTRATE MR. HERBERT TILLEY'S PAPER ON THE INTRANASAL TREATMENT OF EMPYEMA OF THE FRONTAL SINUS.

(3) The establishment of a non-suppurative lining mucous membrane, or the complete obliteration of the bony cavity by organised granulation-tissue.

Finally, the intranasal method must possess advantages over the external operation, and show equally good or even better results in those cases where there is a choice as to which method can be employed.

Guided by the principles just enunciated it will be clear that only a certain percentage of cases treated by the intranasal method will be curable.

If the frontal sinus is of moderate size, free from bony septa which divide it into almost separate chambers, and the fronto-nasal canal permits of enlargement so that free and permanent drainage can be secured, then we may look for success even to the establishment of a cure. If these desiderata are absent, then while the intranasal operation may induce marked relief of symptoms, only the external operation will give the chance of a cure. I use the word "chance" purposely, because even when the sinus is fully exposed from the outside by the Killian or any other operation, we know that a complete cessation of discharge with obliteration of the cavity is sometimes almost impossible of attainment, especially in those instances where the depth of the sinus from before backwards is abnormally great.

What, then, are the conditions which would lead us to favour the intranasal method of operation?

(1) When the sinus is capable of being entered by a suitably curved probe or cannula. And here I would say that, generally speaking, a diseased sinus is easier to enter than a normal one.

(2) When the sinus is not subdivided by septa into practically a series of almost separate bony-walled cavities.

This information can only be gained beforehand by a good skiagram, and this method of examination must never be omitted either in the intra- or extra-nasal operation, for the knowledge it will give us may be invaluable in many ways.

Granted the favourable conditions referred to, I do not think that the chronicity of the case, or the extent of pyogenic membrane present, need militate against our choice of the intranasal method, because if free drainage can be secured by enlarging the fronto-nasal duct we can destroy a great part of the unhealthy membrane by methods to which I shall refer presently.

What conditions should influence us in selecting the external method?

(1) A narrow, tortuous fronto-nasal duct which will not permit the passage of a probe.

This condition becomes less frequent with increased experience in intranasal manipulation and knowledge of anatomical detail. The narrow tortuous duct is often due to a large cell or cells in the upper anterior end of the uncinate process—the so-called “agger” cells, and these are easy to remove, as Mosher has shown, and I can heartily endorse his assertion that by such a removal a fronto-nasal duct hitherto impassable may be easily traversed by a full-sized probe.

The specimens shown demonstrated this point very well.

(2) When the posterior wall of the frontal sinus is so low as to closely overhang the ostium of the sinus. Any force used in trying to enter the sinus cavity in these conditions might easily set up an infective meningitis. Possibly the fatal cases published some years ago by Schäfer, Mermod and others belonged to this category.

A profile skiagram might give invaluable information in such a case, and if there was any doubt about it, the probe should be passed under the guidance of the Röntgen ray.

(3) Those cases would be especially dangerous where the “ostium” of the sinus is situated above the level of the cribriform plate, and still more so when, in addition, the ostium is close to the sagittal plane.

(4) The external operation would generally be necessary in the presence of an external fistula, of ocular or meningeal symptoms, or if severe symptoms continue after the intranasal operation has been performed.

One great point in favour of the preliminary intranasal operation is that by means of it we are enabled to remove practically all the obstruction in the nasal cavity below the level of the ostium of the sinus, and this applies to septal deformities as well as ethmoidal obstruction, whether the latter be diseased or in a normal condition. Hence, even if an external operation be later on advisable, one essential point in its success has already been attained, for everyone will agree that free intranasal drainage is the chief desideratum in all external operations on the frontal sinus.

Finally, if by care and attention to the anatomical details already outlined we can render the intranasal method less dangerous than the external operation, the approach to the diseased sinus through the nasal cavity possesses two supreme advantages over the external route :

(1) It is free from the indelible scar which has so often induced

patients to put up with their troubles rather than submit to external operation.

(2) The time involved in after-treatment is enormously reduced. In the external operation this will be rarely less than from four to six weeks, and during this period the patient is almost totally incapacitated from work or pleasure because of a bandaged or covered eye. On the contrary, after the intranasal method the patient can usually go out with safety a week after the operation.

THE INTRANASAL OPERATION FOR THE RELIEF OR CURE OF CHRONIC INFLAMMATION OF THE FRONTAL SINUS.

In the following brief description I shall assume that the disease is of long standing, that the lining membrane has undergone extensive polypoid degeneration, and that the anterior ethmoid cells are in a condition of chronic inflammation, which shows itself by the presence of numerous polypi or polypoid buds, and that when the cells are examined by a probe they give evidence of undue friability owing to rarefying osteitis. I shall also assume that it is possible to catheterise the sinus through the fronto-nasal canal, and that a frontal and lateral skiagram show that the conformation of the sinus does not contra-indicate treatment by the intranasal method.

Three quarters of an hour before the administration of the general anæsthetic a hypodermic injection of morphia gr. $\frac{1}{6}$ and atropine gr. $\frac{1}{100}$ is administered. This will check undue secretion of mucus in the nasal cavity and minimise certain dangers inherent to general narcosis.

A small swab of gauze soaked in equal parts of a 20 per cent. solution of cocaine and adrenalin chloride should be applied to the middle meatus and middle turbinal regions.

Immediately before the operation the frontal sinus should be thoroughly washed out with normal saline solution to which a little peroxide of hydrogen solution may be added. The maxillary antrum should also be irrigated if it acts as a reservoir or generator of pus.

I attach great importance to this preliminary cleansing as a means of avoiding post-operative septic contamination.

When the patient is anæsthetised and lying on his back with the head slightly raised on a pillow, I remove the middle turbinal bone by means of Walsham's scissors and snare. Any little bleeding

can be readily checked by the application of gauze moistened with peroxide of hydrogen solution.

One next endeavours to enter the anterior ethmoidal cell region, to remove this thoroughly, and in so doing to destroy the fronto-nasal canal and gain as close and as free access to the frontal sinus as is possible without running undue risks. The anterior ethmoidal cells can be best entered opposite and external to the anterior attachment of the middle turbinal (*vide* Plate II, fig. 4).

For this purpose a small mastoid gouge on a long shank is very useful.

Pressure outwards and slightly backwards will easily break into the anterior cells, and the instrument continues in this direction till it meets the lachrymal bone and the os planum of the ethmoid. Its presence in the region of the lachrymal bone can easily be detected by the surgeon placing a disengaged finger over the internal canthus. The cutting edge of the instrument should now be directed downwards, and with a little gentle pressure the "bulla" and lower anterior cells may be destroyed and semi-detached fragments removed with suitable forceps.

Externally the excursion of the curette will be limited by the lachrymal bone and the os planum of the ethmoid, anteriorly by the hard posterior edge of the ascending process of the superior maxillary bone. Posteriorly it will be possible to enter the posterior group of cells and even the sphenoidal sinus, if the conditions present demand the destruction of all the ethmoidal cells.

Having thus destroyed the anterior group of ethmoidal cells, including the agger cells when present, and the fronto-nasal canal, it should now be easy to pass a probe into the frontal sinus.

Finally, an effort should be made to enlarge the "ostium" of the sinus, so as to provide free drainage into the nasal cavity.

I have already shown at this Section a burr constructed for this purpose and it has served me excellently.

The instrument is constructed as to its curves on the plan of most frontal sinus probes, and the distal end is thickened and roughened for $\frac{3}{8}$ in., but only on its anterior and lateral surfaces; the end and posterior surfaces are flat and smooth, so that it is almost impossible to injure the posterior wall of the sinus if it should lie close above the ostium.

The burr is made in two sizes and the smaller is passed first.

When it enters and is engaged in the upper end of the fronto-nasal duct or the ostium, it is drawn downwards and forwards with a little pressure of the upper end outwards. By this means the

PLATE II.

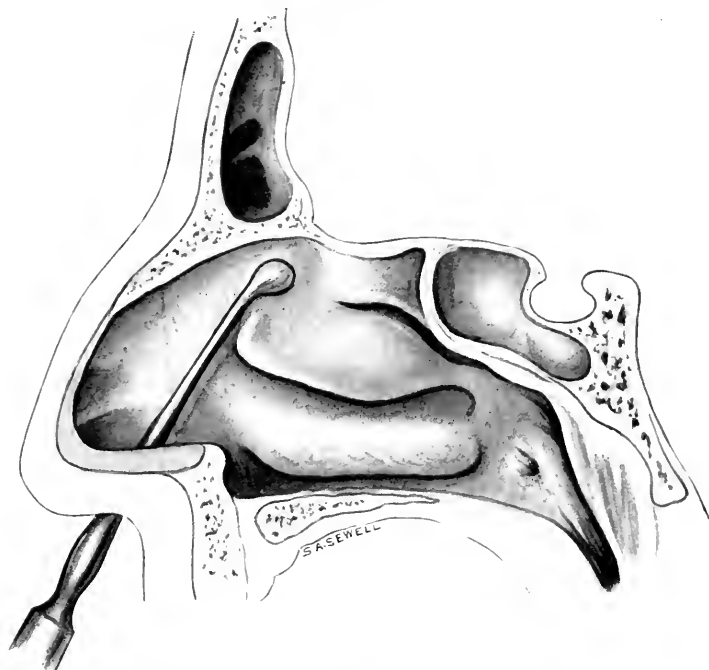


FIG. 4.—Indicates the site where access is gained to the anterior group of ethmoidal cells.

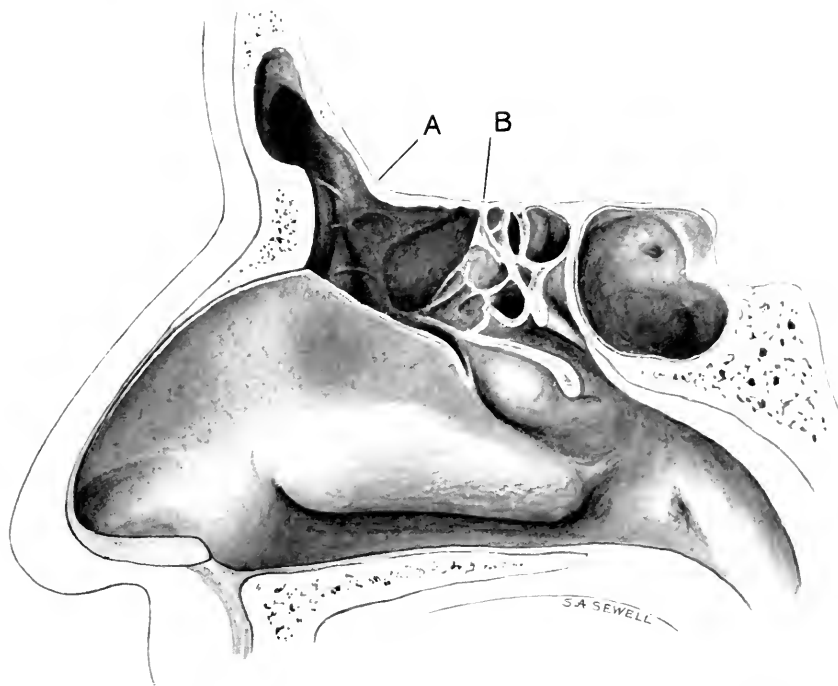


FIG. 5.—A-B. Area included between these lines indicates the ethmoidal region when the anterior group of cells have been removed. (From specimen dissected by author.)

TO ILLUSTRATE MR. HERBERT TILLEY'S PAPER ON THE INTRANASAL TREATMENT OF EMPYEMA OF THE FRONTAL SINUS.

ostium may be considerably enlarged, especially if a "frontal bulla" is present.

In using these or any other instruments in this region, the surgeon must bear in mind that it will be safer, and he will meet with less resistance, if he enlarges the ostium by destroying the outer half of its circumference rather than the inner, which may be in close proximity to the cribriform plate.

Having made as free a communication with the nasal cavity as is possible the operation is finished (Fig. 5), and all that is necessary is to place a small piece of cotton-wool in the nostril. This should be constantly replaced as soon as it becomes soiled, and it should be worn for at least a week following the operation.

After forty-eight hours the nasal cavity should be sprayed with a 5 per cent. solution of cocaine, and then cleansed by means of a warm, alkaline, coarse spray to which some peroxide of hydrogen solution has been added and the frontal sinus irrigated through a cannula with the same solution.

This treatment should be carried out daily for a week or ten days, or until the discharge from the frontal sinus has ceased or shows signs of doing so.

Any tendency to the growth of exuberant granulations in the ethmoidal region, and more especially around the opening into the frontal sinus, can be checked by the application of nitrate of silver.

If the discharge from the frontal sinus does not show signs of ceasing in a week or ten days, it is good treatment to cleanse it as thoroughly as possible (*vide supra*), dry it out by the insufflation of warm air, and then inject a solution of silver nitrate, 60 gr. to the ounce.

This will destroy the greater part of the villous outgrowth of the pyogenic membrane and permit the re-growth of a more normal lining membrane.

I have been practising this operation for the past three years and so far I have had no fatality. Neither have I been haunted by that always possible and nearly always fatal complication septic osteomyelitis of the frontal bone. My results have been more satisfactory since Mosher pointed out the importance of the "agger" cell at the meeting of the British Medical Association in Liverpool in 1912, and I do not think we can over-estimate the practical importance of his observations.

For two years I have not performed either in hospital or private practice any external operation on the frontal sinus for *chronic* empyema, but I have done at least thirty intranasal operations.

If I am asked, "Have you cured them all?" my reply will be, "Certainly not," if is meant by the term "cure" a total absence of any purulent or muco-purulent discharge from the sinus. Some of the patients, however, are cured even when judged by this severe test, but most of the remainder have been relieved of headache and other subjective symptoms, while the amount of discharge has been so reduced as to be almost a negligible quantity.

And here let me say that I have had the opportunity of seeing from time to time during the past twenty years patients with frontal or other sinus suppurations, some of whom have had temporising operations performed, while others refused any form of operation, and yet to-day they seem in perfect health, and only suffer from the slight inconvenience of the discharge for which they originally consulted me, and many of them were probably advised to undergo the external radical operations.

Let me give you one illustration.

Three weeks ago a patient came to see me whom I first saw fifteen years ago for nasal polypi and bilateral suppurative pansinusitis; I then discussed with him the radical external operation on both frontal sinuses, but he decided against any intervention as it was only the inconvenience of the discharge for which he consulted me. On the occasion of his recent visit he reminded me of my earlier and radical suggestions, and when I looked at him, standing as he did 6 ft. 3 in. in height, weighing 16 st., the picture of health and strength, and when he added, "I have never had a headache in my life," it seemed to me that we have yet a lot to learn about the protective agencies which Nature manufactures in the laboratory of the human body, and that we must not always regard a purulent nasal discharge as a grave condition leading necessarily to the formation of gastric ulceration, septic pneumonia, intestinal toxæmia and other possible evils.

And when I review my own experiences and think of those recorded by others (such, for example, as are to be read in a paper by Dr. Ross Skillern in the *Laryngoscope*, November, 1913, "Untoward Results following the External Operation on the Frontal Sinus: A Critical Review of Twenty Cases"), one cannot escape the conclusion that more patients have died or suffered as a result of the external operation than from the untreated disease. Furthermore, when we look back upon our most successful cases in which the scar is almost invisible and the intranasal discharge has quite ceased, and bear in mind the tedious and often painful after-treatment, the prolonged convalescence and the

occasional periods of anxiety which the treatment involved, have we not sometimes asked ourselves, "Was it really worth while?"

To-day's discussion may point a happier way for at least some of our patients, and I am grateful to the Council for inviting me to state in what way, and for what reasons, my enthusiasm for the external operation has been so tempered by experience that when it is possible I prefer to adopt the intranasal method.

Note.—In conclusion I wish to acknowledge my obligation to the works of Ingals, Spiess, Halle, and Good, as well as to those whose names have already been mentioned.

THE INTERNATIONAL COLLECTIVE INVESTIGATION OF OZÆNA.

(Third Notice.)

BY A. BROWN KELLY, D.Sc., M.D.,

Glasgow.

THE death of Prof. Grabower in January deprives us not only of a laryngologist of the first rank, but also of a member of the committee first appointed to organize the International Collective Investigation of Ozæna. Of that committee, the third member, Prof. Alexander, alone survives. Fortunately, he is as indefatigable and enthusiastic in the work of this investigation as when first he promulgated the scheme at the Rhino-Laryngological Congress in Berlin in 1911.

A fresh impetus has been given to the Collective Investigation by the bringing to light of the all but forgotten researches of Perez, to which important significance is now attached.

PEREZ' RESEARCHES.

Dr. Fernando Perez, of Buenos Ayres, described in the *Annales de l'Institut Pasteur* in December, 1899, a small, polymorphous, Gram-negative, immobile rod as the exciting cause of ozæna, and termed it *Cocco-bacillus fœtidus ozænæ*. His numerous publications on the subject received but scanty attention. In consequence of a correspondence with the Berlin Committee of this Investigation he submitted his results last year to the Institute of Sero-Therapeutics in the University of Vienna, from which he received complete confirmation.

In November last he read a paper on ozæna at a meeting of the Berlin Laryngological Society.¹ In the course of this he stated that having recognised ozæna to be a family disease, and that a mother with ozæna might have one or more children similarly affected, he was led to regard the disease as infectious. At first he assumed the infection to be due to the Loewenberg-Abel organisms, but after studying their cultural properties and failing to produce the disease in animals, he proceeded to investigate thoroughly the flora of the nasal cavity in ozæna patients. He succeeded in isolating the following organisms: *Staphylococcus albus* and *citreus*, diphtheroid bacillus, *B. coli*, *B. pyocyaneus*, *M. tetragenus*, streptococcus, proteus, pneumococcus, yeast-cells, and lastly, a special cocco-bacillus which differed from all the known varieties. Perez now believes that this microbe is the cause of the disease and he has termed it *Cocco-bacillus foetidus ozænæ*.

This organism is stained with aniline dyes but is Gram-negative. In ozæna secretion and in cultures it appears as a small immobile cocco-bacillus, which at the temperature of the body grows well on almost all media. In peptonised bouillon it forms in twenty-four hours a marked sediment with cloudy supernatant fluid. On agar, fairly abundant colonies develop. On plates, small opaque deep colonies may be seen. The organism does not liquefy gelatin, it grows on potato media, never curdles milk, and produces ammoniacal fermentation of urine. All cultures of this cocco-bacillus give rise to a specific, characteristic odour which is exactly similar to that of the disease.

Inoculation experiments by Perez gave striking results. Injection of $\frac{1}{4}$ c.cm. of a bouillon culture into the marginal vein of the ear of a rabbit caused death in twenty-four hours. After the injection the animal became quiet, lost its appetite, and the temperature rose rapidly. During this period the nasal secretion was observed to be purulent, hæmorrhagic, and occasionally abundant. At the autopsy hyperæmia of the spleen was found, but the outstanding changes were in the nasal fossæ, and consisted in marked inflammation of the mucous membrane of the turbinates, especially the anterior, which corresponds to the inferior in man. Bacteriological examination revealed the presence of the injected organism. Hofer produced similar changes, only somewhat less intense, by injection of toxins from Perez' microbe.

If the animal resisted the inoculation it became affected by a

¹ "Die Ozæna eine infectiöse und contagiöse Krankheit," *Ber. klin. Wochenschr.*, No. 52, 1913.

chronic nasal disease characterised by a constant discharge in which the inoculated organism was again found. If, after some months, it was killed, a very remarkable condition could be demonstrated, namely, atrophy of the anterior turbinate, which varied with the severity and duration of the inflammation.

These experiments show that this cocco-bacillus produces, not an ordinary inflammation of the nasal cavities, but a chronic process leading to atrophy of the anterior turbinate, so that changes result comparable to those found in the human subject.

Ozæna is thus proved by experiment to be infectious; it can also be shown clinically to be contagious.

Perez investigated the contagiousness clinically, and found 93 cases in which the disease had been transmitted from one member of the family to one or several other members, and 35 cases in which the disease had been contracted by coming into contact with subjects of ozæna who were not members of the same family. This inquiry was valuable in allowing of the recognition in families affected by the disease of the earlier stages of ozæna which usually escape notice. In a family of several children, if one or two presented the classical signs, others were found to suffer from chronic coryza with little or no atrophy. There are likewise cases of chronic coryza the ozænatous nature of which is revealed when one inquires as to the possibility of contagion.

The theory of infection also furnishes an explanation of the occasional spontaneous cure of ozæna.

One need not be surprised that the part played by contagion is not apparent; it must be looked for. It was the same with tuberculosis.

Ozæna may be transmitted to man also by the dog. This important fact has been proved bacteriologically and clinically by Perez, but notwithstanding his publications on the subject it is but little known.

The cocco-bacillus which is found in the secretion of ozæna patients occurs normally in the dog's nose, and increases in those suffering from distemper. It produces pneumonic patches. Perez has not found it in the nasal cavities of other domestic animals. It is thus the dog only, and particularly the diseased dog, that can transmit ozæna. The possibility of such a mode of infection should receive consideration when a solitary case of ozæna occurs in a family.

HOFER'S EXPERIMENTS.

Perez' experiments have recently been repeated and his results critically scrutinised by Hofer.¹

In his paper, Hofer refers to the difficulty of isolating the *Cocco-bacillus fetidus ozaenæ* owing to the great variety of organisms present in ozaena crusts. For several weeks he endeavoured to obtain a pure culture without success. Ultimately he adopted the expedient of injecting into the vein of the rabbit's ear a mixed culture in bouillon in which, owing to its characteristic smell, he assumed the fœtor-producing organism was present. In a few days the animal had a profuse purulent nasal discharge from which a pure culture of the *Cocco-bacillus fetidus ozaenæ* was obtained.

The result of the agglutination test of the patient's serum for the *Cocco-bacillus fetidus* is of interest. In a small fraction of the cases examined distinct agglutination was obtained, demonstrating the specific nature of the process.

When we consider the purely local character of the disease and the toxicity of the microbes present, under which circumstances we almost never expect higher agglutination values, the fact mentioned is significant.

Hofer and Kofler² tried a vaccine of the *Cocco-bacillus fetidus* in ozaena patients. The vaccine was obtained from strains from seven different cases of ozaena, and was thus polyvalent. It was injected subcutaneously in doses of 10 to 500 million organisms weekly. Thirty cases were treated, all of which presented the cardinal symptoms of genuine ozaena. The Wassermann test was also applied.

In all of the cases more or less local reaction was evidenced by pain at the place of puncture with slight redness and infiltration. As a rule, all these symptoms appeared after the first three injections.

The following manifestations of a nasal reaction were observed: Immediately after the first few injections, and in some cases after the later injections, acute cold in the head with various local disturbances, *e. g.* marked pulsation, epistaxis, redness of nostrils, tendency to sneeze and frequently temporary aggravation of the fœtor.

Amongst other local reactions might be mentioned: Flushing of

¹ G. Hofer, "Zur Frage nach der Ätiologie der genuinen Ozaena," *Berl. klin. Wochenschr.*, No. 52, 1913.

² G. Hofer und K. Kofler, "Bisherige Ergebnisse einer neuen Vakzinations-therapie bei Ozaena," *Wiener klin. Wochenschr.*, No. 42, 1913.

the face, congestion and feeling of heat in the head, headache, pain over both frontal processes, toothache, conjunctivitis, sore throat, tinnitus, all of which were but slightly marked.

Sooner or later in the course of the treatment in almost all cases a surprising diminution or even complete cessation of the fœtor was observed. This was noted in the examination both of the patients and of the crusted material removed. It should be emphasised that the decrease in intensity of the fœtor took place before any diminution in the crust-formation was evident. The liquefaction of the secretion which is very often seen at the beginning of the treatment might explain this fact, had a similar loss of fœtor not been noted in cases in which no loosening of the crusts had occurred. This condition, in which there is no visible retrogression in crust-formation, but cessation of the fœtor, sometimes persists for a considerable time. The effect on the fœtor is due solely to a specific influence. Hofer is inclined to attribute the fœtor to the direct activity of the micro-organisms, which is also observed in cultures. He therefore regards fœtor as the most sensitive manifestation of the disease and the first to show the reaction.

The diminished crust-formation allows the patient to reduce the frequency of, or to discontinue, the washing of the nose. The crusts sometimes assume the aspect of normal nasal secretion.

One of the earliest results of the treatment is the disappearance of the pharyngitis or laryngitis sicca. This is due partly to the liquefaction of the secretion and partly to diminution or cessation of crust-formation.

Hofer, in conclusion, states that he believes active immunisation with Perez' microbe offers a very favourable prospect. Time alone will show whether the improvement amounts to cure. He is convinced that the therapeutic results at present obtained are not merely symptomatic, and this consideration supports the view that the *Cocco-bacillus fœtidus* is the ætiological agent.

ADDITIONAL AIMS OF THE INVESTIGATION.

It is now the duty of the Collective Investigation to study in detail the researches of Perez. This is being done in the Imperial Public Health Office in Berlin, where two investigators are engaged solely in the work, also in Vienna, Buda-Pesth, Prague, Königsberg, Posen, Christiania, Turin, and Glasgow. It is desirable, however, that these examinations be conducted in as many places as possible

so that unprejudiced results may be obtained. Dr. Gustav Hofer (Institut für allgemeine und experimentelle Pathologie, Kinderspitalgasse 15, Vienna) has kindly promised to send original strains of the bacillus of Perez to all interested.

The solution of the following problems is required :

(1) Is the bacillus of Perez present in the nose in ozæna, and in what percentage of cases ?

(2) Is it true, as Perez states, that cultures of his bacillus give rise to an intense fœtor typical of ozæna ?

(3) When injected into the marginal vein of the rabbit's ear, under the precautions given by Perez and Hofer, does the bacillus produce atrophy of the anterior turbinal of the experimented animal ?

(4) Is the bacillus of Perez also found in the healthy nose or in other affections of the human nose, especially in those characterised by crust-formation ?

(5) Do other bacteria exist in the human nose which produce in the experimented animal symptoms similar to those excited by the bacillus of Perez ?

Perez now maintains, as stated above, that his bacillus occurs also in the dog's nose, and that ozæna may be transmitted from the dog to man.

As a consequence, the following additional questions require consideration :

(6) Is the bacillus of Perez present in the dog's nose (*a*) when healthy, and (*b*) when diseased ?

(7) Does the bacillus of Perez occur also in the nose of other animals, especially domestic pets ?

(8) In the noses of animals do other bacteria exist which produce in animals experimented on symptoms similar to those caused by the bacillus of Perez ?

The Berlin Committee believe that questions 6-8 can best be settled in the laboratories of veterinary schools. Workers in this investigation having such facilities at their disposal and capable of utilising them are requested to do so.

We have pleasure in acknowledging further assistance from the Carnegie Trust towards this investigation in granting Dr. J. F. Smith a research scholarship. Dr. Smith, who has already done a considerable amount of work in connection with ozæna, is now engaged almost exclusively in forwarding the objects of the International Collective Investigation of Ozæna by bacteriological and serological research. He has kindly undertaken to carry out

bacteriological examinations, the Wassermann reaction, etc., in ozæna cases for those engaged in this collective investigation. Tubes to contain blood, suitably packed for transmission by post, may be obtained free of charge on application to him at the Clinical Laboratory, Western Infirmary, Glasgow.

It is the intention of the Central Committee in Berlin to present at the meeting of the Fourth International Laryngo-Rhinological Congress, to be held in Hamburg in 1915, a review of all the reports received from the different countries in which the collective investigation of ozæna has been carried on; also, all scientific works bearing on the subject that owe their inception to this investigation. The review, reports, papers, etc., will be published in a special volume. Authors are particularly requested to reserve their contributions for first publication in this volume, inclusion in which will not preclude publication elsewhere. A number of papers have been already promised. In order to get an idea of the probable amount of material available and to make arrangements for printing, intimation of papers, mentioning subject and length, should be sent to the Berlin Committee before July 1, 1914.

All reports, papers, etc., bearing on the Collective Investigation in Great Britain and the Colonies, should be in the hands of the writer not later than December 1, 1914.

REPORTS FOR THE YEAR 1913 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART IV.

NOTES UPON THE RESULTS OBTAINED IN TWO HUNDRED
CONSECUTIVE CASES OF ACUTE OTITIS MEDIA
IN WHICH THE SCHWARTZE OPERATION WAS
PERFORMED.

BY JOHN HEWAT, M.D.,

Senior Clinical Assistant.

PERUSAL of the paper read by Holger Mygind "On Secondary Suture after Simple Resection of the Mastoid Process" at the Otological Section of the International Medical Congress, London, 1913, led the writer to prepare the following notes, which are taken from two hundred consecutive operations performed during a period of five years. They were carried out by Dr. Logan Turner

and Dr. J. S. Fraser in the Ear, Nose, and Throat Department of the Royal Infirmary, Edinburgh.

The technique in all the cases was briefly as follows: One half-hour before operation a hypodermic injection of morphia $\frac{1}{4}$ gr. and atropine $\frac{1}{120}$ gr. was given in the large majority. The anæsthetic was chloroform followed by ether. A curvi-linear incision was made a quarter of an inch behind the post-auricular groove from a point a quarter of an inch above the temporal ridge downwards to the tip of the mastoid process. The mastoid cells were either entirely removed or very freely opened up, and the antrum was opened in every case. The tip of the mastoid was removed in 100 cases, and the zygomatic cells only in a few cases. The mastoid wound and external auditory canal were packed with iodoform worsted, and the upper and lower angles of the skin incision were sutured with silkworm-gut.¹ Provided there were no contra-indications, the first dressing followed five days later, and afterwards a daily change of dressing was carried out, sterilised gauze being substituted for the iodoform worsted. The mastoid wound was cleaned at each dressing with peroxide of hydrogen, and dried before the packing was inserted. Finally, when the wound in the mastoid was well filled with healthy granulations and the discharge had ceased from the middle ear, the edges of the post-auricular wound were stitched together, after freeing them from the underlying bone. The object of the plastic operation was both to hasten healing and prevent deformity. A general anæsthesia was used for this purpose in 20 cases and local anæsthetic in 130 cases. The secondary plastic procedure was performed on an average twenty-seven days after the mastoid operation; in some cases, however, after a shorter, in others after a longer period of time.

Age and Sex of Patients.—The age of the patients ranged from 5 months to 59 years; the average age was 23 years. There were 95 males and 105 females. The right ear was affected in 112, the left in 88 cases.

Cause of the Otitis Media.—The majority of the cases were attributed to influenza, septic conditions of the throat, acute rhinitis, scarlet fever, and bathing in that order of frequency.

Duration of the Otitis Media.—This varied from three days to five months. The average duration was five and a half weeks. In ten of the cases there was a history of previous discharge from the same ear; in twenty there was no history of discharge from

¹ Except in cases in which the tip was removed, when the lower suture was omitted.

the ear; in ten the discharge had stopped some days before admission to hospital. In one there was well-marked facial paralysis, but no history of ear discharge; in four there was a chronic discharge from the other ear; and in twelve there was an acute catarrhal condition of the other ear. The hearing before operation averaged c.v. $2\frac{1}{2}$ feet.

Indications for Operations.—Mastoid swelling in 140 cases (œdema or abscess). Mastoid tenderness combined with sagging of the meatal wall or bulging membrane, 60. Symptoms suggesting an intra-cranial complication, 22.

The Temperature before Operation.—(i) 98.4° F. or below: 104 cases, including 30 with sub-periosteal abscess and 3 with intra-cranial complications (2 peri-sinus abscess, 1 sigmoid sinus thrombosis).

(ii) Between 98.4° and 99° F.: 29 cases, including 9 with sub-periosteal abscess and 2 with intra-cranial complications (1 extra-dural abscess, 1 cerebellar and temporo-sphenoidal abscess).

(iii) From 99° to 100° F.: 28 cases, including 15 with sub-periosteal abscess and 5 with intra-cranial complications (1 acute labyrinthitis and meningitis, 1 sinus thrombosis, 2 extra-dural abscesses, 1 meningitis).

(iv) Above 100° F.: 36 cases, including 10 with sub-periosteal abscess and 12 with intra-cranial complications (1 extra-dural abscess, 1 cerebellar abscess, 5 lateral sinus thrombosis, 2 extra-dural abscesses and meningitis, 2 purulent labyrinthitis and meningitis, 1 extra-dural abscess and diffuse osteomyelitis).

In group iv the cause of the temperature in 22 cases was accounted for, either by an intra-cranial complication, or possibly by the existence of a sub-periosteal abscess. Of the remaining 14, the elevation of temperature was accounted for in 9 by an attack of influenza, a septic throat, a mild attack of rheumatism, or pulmonary complications following the mastoid inflammation; but the cause of temperature of over 100° F. in 5 cases could only be attributed to the ear conditions. Three of these patients were under ten years of age.

It might be of some interest here to quote Dr. Vérel's conclusions, published in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, 1913, based on 125 cases of mastoiditis complicating acute and chronic suppurative otitis media.

(1) In 96 of the 125 cases (77 per cent.) of acute mastoiditis complicating acute and chronic otitis media there was no fever (temperature of 100° F. or over).

(2) Of the remaining 29 cases in which fever was present an intra-cranial complication was found in 22 cases, while in two the temperature could be explained by the presence of such conditions as septicaemia and pulmonary tuberculosis. In 2 cases there was no mastoiditis.

(3) In only 3 of these cases (2.4 per cent.) no condition other than the mastoiditis was found at operation to account for the fever.

Thus mastoiditis of itself very rarely gives rise to fever (temperature of 100° F. or over). If fever be present we must suspect an intra-cranial complication or some general toxic condition.

It is necessary to point out in connection with the temperature observations that the cases of acute otitis media with mastoiditis quoted by Dr. Vêrel form part of the same material which is utilised in this paper.

The Pulse-rate before Operation.—In order to ascertain the probable normal pulse-rate of each patient one week was allowed to elapse after the operation, and then the average was taken from the records during the second and third weeks of convalescence. Prior to operation, 30 cases showed an increase of 15 to 30 beats per minute; 140 cases showed an increase of 30 or more beats per minute.

Bacteriological Findings.—Out of 132 cases investigated, organisms were found in 117 cases.

Pure culture: *Streptococcus pyogenes*, 47; *Streptococcus faecalis*, 1; *Streptococcus anginosus*, 1; pneumococcus, 19; *S. mucosus capsulatus*, 2; *Staphylococcus aureus* 7, *Staphylococcus albus* 3 = 10; *B. tuberculosis*, 1. Mixed cultures, 36; no growth, 15.

Results of Operation.—There were 164 cases discharged cured out of 200 cases. The average duration of the healing process, that is to say until the closure of the posterior wound, was forty days. Sixty-two were discharged cured in one month or rather less from the date of operation.

The shortest period of healing was seventeen days—the case of a boy, aged seventeen. The duration of the ear trouble before operation was two weeks. Cause: acute cold. The bacteriological examination showed a mixed infection of streptococcus and *Staphylococcus albus*.

The case of longest duration was three months—that of a child, aged four. Duration of the ear trouble before operation was six weeks. Cause: influenza. Bacteriology: *Streptococcus*. The

mastoid wound had to be thoroughly scraped on two occasions before healing ultimately took place.

The following facts must be noted in regard to the remaining 36 cases :

(a) In 4 the occurrence of scarlet fever within two weeks of the operation necessitated the removal of the patients to the fever hospital, and their subsequent history could not be ascertained.

(b) In 13 it was necessary to perform the complete mastoid operation later; in 3 of them this was deemed imperative on account of labyrinthine and intra-cranial symptoms; in 9 the somewhat indefinite history regarding the duration of the discharge and the appearance observed at the time of the Schwartze operation raised the question as to whether the cases should not be regarded as chronic, and therefore more suitable for the complete operation at the outset. They were, however, given the benefit of any possible doubt.

(c) In 2 a secondary modified radical operation was performed.

(d) In 6 a secondary complete operation was refused.

(e) In 10 there was a fatal termination, death being due in 9 to an intra-cranial condition already complicating the acute otitis, and in 1 where the patient died twenty-four hours after the operation from the effects of the anæsthetic.

In the series of 200, therefore, there were 9, or 4 per cent., in which the Schwartze operation failed to effect a cure when the uncomplicated otitis media was definitely acute, namely, 1 case in group (b), 2 in group (c), and the 6 constituting group (d).

The Fatal Cases.—Four of these were reported in full by Dr. J. S. Fraser in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, March and April, 1912. They included 3 from meningitis (in 2 at least labyrinthitis was also present), and 1 death from septicæmia.

The remaining 6 were as follows :

(1) Anæsthetic death ; post-operative.

(2) Admitted with symptoms of meningitis. Operation : death on following day. No *post-mortem*.

(3) Lateral sinus thrombosis. Operation : six days later death with lung complications. No *post-mortem*.

(4) Persistent headaches. Operation : twelve days later death from meningitis. No *post-mortem*.

(5) Intra-cranial complication suspected at operation ; four days later death ; cerebellar abscess and meningitis.

(6) Shivering and vomiting, meningitis suspected. Operation ; six days later death—meningitis. No *post-mortem*.

The final results of the 164 cases discharged cured were obtained six months or more after the Schwartz operation. In hospital cases there is always some difficulty in persuading old patients to return for examination, especially after several years' interval. I was, therefore, only able to obtain a personal examination in 106 cases, while in 15 cases particulars were received by letter.

The Hearing after Operation.—Group A: 58 patients were found to have perfect hearing.

Low whisper was heard at 15 feet.

The watch at $\frac{3}{30}$.

In 45 of these it was interesting to note that the tuning-fork on the vertex was lateralised to the operated ear, although the hearing was normal.

AC > BC. All heard C 32. It was very doubtful whether any of the patients could hear C 16.

B.—In 17 patients the hearing was not perfect, but it was equal to that of the other ear.

Raised whisper to ordinary voice at 15 feet.

Watch $\frac{2}{30}$ to $\frac{1}{30}$. AC > BC in 10 cases. BC > AC in 7 cases.

Weber lateralised to the operated ear in 14 cases.

In this division the deafness could be attributed to the presence of adenoids, senile changes, a temporary cold, or some previous slight attack of otitis media in both ears.

C.—In 17 patients the hearing in the operated ear was worse than that in the other ear.

Raised whisper to ordinary voice at 15 feet.

Watch $\frac{2}{30}$ to $\frac{1}{30}$. BC > AC in all cases.

Weber lateralised to the operated ear in all cases.

The other ear in 15 of these cases was apparently normal, and in 2 the hearing was slightly defective. The patients' ages averaged twenty-eight years. There were 3 over thirty-five years of age. The cause of the acute otitis media in these cases was acute rhinitis (3), influenza (3), erysipelas (1), whooping-cough (1), scarlet fever (1), measles (1); no cause given in 7. The duration of the ear trouble before operation averaged forty-six days. The average duration of healing was forty-one days. Since the operation 4 of these patients have suffered from acute catarrh, 3 have had a discharge from the ear which has since dried up, and 1 has a dry perforation of the membrane.

D. : *Miscellaneous.*—Two deaf-mutes. Membranes look healthy.

There were 11 patients in which the age would not permit of a satisfactory examination of the hearing. The local appearances were, however, quite satisfactory.

Results obtained by letter in 15 cases : Of these 14 were very satisfactory ; there was 1 in which the hearing was poor in the operated ear, and at times the patient suffered from earache but with no discharge.

Local Appearances.—In 78 there was only a slight post-auricular depression, or merely the presence of the original skin incision. There was marked depression in 28 cases, 20 of which had had no plastic operation following the Schwartz.

The canal was found to contain wax in 27 cases. The drum-head presented a normal appearance in 80 cases. There was a perforation present in 1 case, but no history of discharge or pain since the operation. At the examination it was ascertained that 4 had suffered from subsequent earache and deafness, following a cold or septic throat, which soon passed off ; 6 suffered from occasional neuralgic pains over the original post-auricular scar, but with no earache or deafness ; nothing was found to account for the pains, and 3 had again suffered from discharge from the ear, following a cold, which soon cleared up. Most of the above cases have already been mentioned under section "C" of the hearing.

REMARKS.

When we bear in mind that in all these cases a very thorough removal of the mastoid cells was carried out and that the resulting cavity was treated by packing, the average duration of the healing process, namely forty days, must be regarded as satisfactory. There is no doubt that a plastic operation gives a very satisfactory result, and removes the somewhat unsightly depression which often follows packing of the wound. The results as regards the hearing were on the whole good. In many cases it was observed that when the patients were examined, at some considerable period after leaving hospital, the hearing was much better than at the time of their dismissal. A somewhat striking feature in connection with the series of cases is the number of intra-cranial complications met with in acute otitis media. As many as 22 cases were met with—that is, 11 per cent.

In conclusion I wish to acknowledge my indebtedness to Dr. Logan Turner both for his kind assistance and for his permission to record these notes.

SOCIETIES' PROCEEDINGS.

INTERNATIONAL CONGRESS OF MEDICINE.

London, 1913.

SECTION OF OTOTOLOGY.

President, MR. ARTHUR CHEATLE, in the Chair.

Abstract Report by DAN MCKENZIE.

PRESIDENTIAL ADDRESS.

The PRESIDENT, in welcoming the guests to the Section, referred to the progress which had been made in otology since the last International Congress in London thirty-two years before. The temporal bone had been thoroughly investigated. The examination and treatment of school children had forwarded the prevention of ear disease. Light had been thrown upon syphilis and tubercle as they affect the ear. Otosclerosis had been distinguished from middle-ear catarrh. Aural surgery had been perfected, and the work done on the labyrinth had constituted a splendid record.

Discussion on the Surgical Anatomy of the Mastoid.

Report by Prof. J. MOURET (Montpellier).

[The report presented an exhaustive description of the mastoid region and bone, from which we extract a few of the more important features.]

From the surgical standpoint the medial limits of the mastoid region might be placed immediately to the inner side of the internal wall of the mastoid antrum, and the mastoid antrum might be regarded as the centre of interest in all surgical anatomical work in this region.

He proceeded, with the aid of bony sections and photographs, to describe in detail the various surfaces and aspects of the mastoid process. *The external surface* presents a subcutaneous anterior portion and a posterior portion covered with the tendinous insertion of muscles. The spine of Henle and the retro-spinal fossa correspond, though not invariably, to the floor of the aditus ad antrum, from which they are separated by a distance of from 5 to 10 mm. in the adult, much less in the infant. The retro-meatal cribriform zone, which occupies the retro-spinal fossa and the bone around it, giving exit to numerous fine vessels, forms one of the routes by which endo-mastoid infection reaches the surface to form periosteal mastoid abscess. The mastoid emissary vein, or veins, leading from the lateral sinus, are sometimes quite voluminous; they always open obliquely upwards or downwards in the posterior portion of the mastoid process under cover of muscle. When the vein is large it

may give rise, when divided, to bleeding, resembling in severity that produced when the lateral sinus itself is opened.

The petro-squamous suture, more or less definitely marked, traverses the region ordinarily exposed in mastoid operations, extending, as it does, from the squamo-masto-parietal angle down towards the apex of the mastoid process more or less. From this suture a fissure, more or less complete, passes in towards the floor of the antrum, and may offer a route by which infection from the antrum reaches the surface. In the absence of this suture a line may be indicated in the same direction from the squamo-masto-parietal angle to the middle of the apex of the mastoid. This corresponds to the normal situation of the lateral sinus, and to the junction of the base of the petrous bone with the posterior (cerebellar) part of the mastoid. Finally, this line forms the posterior limit of the field of operation on the antrum. In small mastoids the line lies far forward, and so indicates the necessity for caution, as in these cases the sinus also usually lies far forward (fœtal type).

Turning to the *anterior aspect of the mastoid*, which is concerned chiefly with the bony meatus, attention was drawn to the mastoid cells which abut upon the posterior wall of the meatus, the limiting cells of the meatus, and which are separated from it by very thin bone, and which are also in close relationship with the aditus ad antrum.

After the *internal aspect of the mastoid*, formed by cutting the bone, had been described, the *posterior or postero-internal aspect* was dealt with. It consists of three parts: First the *retro-petrous portion* lying between the upper part of the sinus groove and the superior border of the petrous bone, triangular in shape, and known as Jansen's triangle, as it is here, internal to the lateral sinus, that that author removes the bone in exploring for cerebellar abscess. Here also we ought to open the bone to reach empyema of the saccus endolymphaticus. Its lower part, also, is removed in exposing the jugular bulb.

The *second part* of the postero-internal aspect of mastoid is the *sinus groove*, which is about 1 cm. in breadth, and presents two segments, the upper looking inwards (the vertical), and the lower inwards and upwards (the horizontal). The former corresponds to the external aspect of the mastoid process, and the latter to a plane rather higher than that of the inferior aspect of the mastoid. The speaker believed that in some cases the horizontal limb of the sinus (towards the foramen lacerum posticum) was rudimentary, the bulk of the blood in these cases passing out by a large mastoid emissary vein, in a manner reminiscent of the arrangement in early fetal life. Sometimes the sinus occupies an unusually anterior position and comes into relationship with the internal wall of the mastoid antrum. Sometimes, in addition to being far forward, it is also more external than usual, grooving the bone deeply, and coming close up to the posterior wall of the external auditory meatus, from which it is separated by a very thin plate of bone, so entering into the field of operation upon the mastoid antrum. In these cases the mastoid process is very small, mastoid cells are absent, the antrum is rudimentary, highly situated, and represents merely a diverticulum of the epitympanic cavity, as in the fœtus of the fifth month.

The third part of the postero-internal aspect of the mastoid process, the *cerebellar portion*, is the most posterior, lying behind the sinus groove.

The *superior aspect of the mastoid process* shows a furrow corresponding to the situation of the petro-squamous sinus of fœtal life. The furrow ends in a small foramen in the bone leading to a fine canal containing a vein, which opens into the lateral sinus just below the upper border of the

petrous bone. This vein collects blood from the antrum and upper mastoid cells, and so may be one of the routes by which infection may reach the lateral sinus. Immediately subjacent to the superior aspect of the mastoid lies the antrum.

The inferior aspect of the mastoid includes a triangular area of bone, the apex of which is the styloid process; the outer side is formed by the inferior wall of the bony meatus and the inner side of the apex of the mastoid process; the inner side corresponds to the inferior masto-occipital suture. The horizontal lamina of bone in this triangle, lying between the projection downward of the mastoid process and the masto-occipital suture, is of considerable importance. It has received several names, but the speaker preferred to call it simply *the digastric area*. It sometimes contains large pneumatic cells. The digastric area forms the floor of the lower part of the lateral sinus, close to the jugular bulb, from which only the jugular process of the occipital bone separates it. It is by the removal of this lamina of bone that the jugular bulb is reached in operation, and the same manœuvre also opens up the cells of this region, disease of which is the most frequent source of infection of the bulb. If the route taken by the infection is towards the exterior, then a Bezold's abscess results. Cases are on record where this type of abscess seemed to be due to direct passage of infection from the tympanum through the Fallopian aqueduct and the canal of the chorda tympani without the intervening regions being attacked.

Structure of the Mastoid.—The antrum is formed as early as the fourth or fifth month of foetal life, by a projection backward of the epitympanic space between the petrous and the squamous bones. At first a simple cone, its division into aditus and antrum proper appears later. In some cases, however, its development is arrested, and then it presents a conical shape, it lies above the plane of the spine of Henle, and it is very small. In such cases it is difficult to find by the classical retromental operation, and the surgeon is wise to adopt Stacke's operation instead, removing first the outer wall of the attic and the aditus and so going from the tympanum to the antrum—reversing the usual sequence of events. When development of the antrum proceeds normally, it reaches full size and its normal shape as early as the seventh or eighth month of foetal life. But, of course, at birth, the situation of the antrum relative to the external auditory meatus is always higher than in adult life. Indeed, it lies on a plane not only higher than the meatus, but also in such a way that it actually projects further out than the meatus, which, at this early period, is very short. Thus in operations upon newborn children, the antrum is to be sought for, not behind, but above the postero-superior quadrant of auditory meatus.

Dealing with the separate *walls of the antrum* in series, the speaker went on to say that *the external wall* is directed towards the outer surface of the mastoid, and also at the same time towards the posterior wall of the auditory meatus. The antrum lies about 6 mm. (almost $\frac{1}{4}$ in.) deep to the supra-meatal spine, and about 1 cm. (nearly $\frac{1}{2}$ in.) deep to that part of the mastoid which is first broken into in the classical operation upon the mastoid. The antrum for this reason is more rapidly reached if the opening is made by way of the postero-superior wall of the meatus. The speaker laid stress upon this fact, and detailed at length other advantages of adopting this modification in practice. Thus it renders the operator independent of the linea temporalis, which as a guide to the position of the floor of the middle meatus is frequently deceptive. Again, in antra which are placed above the usual situation, the classical route from the

surface of the mastoid being directed below the level of the antrum risks wounding the facial nerve. Thirdly, when the floor of the middle cranial fossa is low, the new route avoids opening it. In the meatal approach a circular area of about 8 mm. in diameter, having the supra-meatal spine as its centre, is the area of operation on the bone. The axis of the opening as it passes in towards the antrum, unlike that of the classical operation which runs in parallel to the posterior wall of the meatus, traverses the postero-superior section of this wall, forming with the posterior wall an angle of about 125° . If in operating thus the antrum is not found at a depth of about 1 cm., all that is necessary is to enlarge the opening in the bone in a forward direction at the expense of the postero-superior segment of the meatus. This brings us towards the aditus without endangering the facial nerve, for the whole of the posterior meatal wall may be removed without danger to the facial if the removal stops short of the tympanic frame. The more the gouge encroaches upon the meatus the closer does it get to the adito-antral cavity.

Further, this route of access keeps away from the lateral sinus even when the sinus is in contact with the meatal wall, for in that condition it is only the inferior three fourths of the wall which is in relationship with the sinus.

The only inconvenience attendant upon this method is that of opening the middle cranial fossa when it is low, but as the gouge is held tangential to the surface of the dura mater that structure runs little risk of being wounded.

Discussing next the *aditus*, the speaker, *inter alia*, referred to the occasional presence of cells in the inner wall above the external semicircular canal. These cells may pass deep into the bony space between the canals (intercanalicular cells), and, if diseased, may lead to labyrinth suppuration. Care should be taken in simple cases not to confound suppuration of a small cell in this situation with true fistula of the external canal.

The *inner wall* of the antrum is of some importance. It presents two areas for examination: the anterior or labyrinthine, and the posterior or cerebellar. The labyrinthine area corresponds to the curve of the external semicircular canal, and, when the antral cavity is deep, also to the curve of the posterior vertical canal. In the former case the length of the labyrinthine portion of the inner wall of the antrum measures from the posterior slope of the hemispherical prominence of the horizontal canal about 3 mm. only; in the latter the labyrinthine portion measures 5 mm. and reaches as far as the curve of the posterior vertical canal. The cerebellar portion of the medial antral wall corresponds more or less to the posterior petrous portion of the mastoid deep to the lateral sinus (see above). In adult life the lateral sinus is not in relationship with this particular wall of the antrum, but in young children it is as a rule.

When the antrum is very small its inner wall does not extend beyond the labyrinth. In opening the external semicircular canal the surgeon should keep to the upper and posterior part of its prominence so as to avoid the facial canal, which lies immediately below its anterior part. To open the posterior canal the chisel is placed on the posterior limit of the hemispherical prominence and driven forward and inward into the inner wall of the antrum to a depth of 3 mm. The chisel, held on the flat, penetrates the convexity of the canal. If the external canal has already been opened, its curve may be followed backwards, until the canal is found to turn forward, when it is abandoned, and the removal of bone

is continued in a direction directly inwards for 1 or 2 mm. This leads us to the middle of the curve of the posterior vertical canal.

The Mastoid Cells.—Large mastoids are usually rich in cells, but this is by no means invariable. And in any mastoid isolated cells or groups of cells may exist which may be overlooked in operating. Thus to open partially a diseased mastoid is a dangerous proceeding, because thereby such isolated cells may be exposed for the first time to infection.

The speaker then proceeded to give a description of his *method of dividing up the external surface of the mastoid* into areas corresponding to the projection on the surface of the deeper anatomical divisions of the temporal bone. In this way he recognises four, or rather five zones: *the anterior petrous zone, the posterior petrous or inter-sinuso-antral zone, the sinus zone, the cerebellar zone, and the apical zone*, the situation of which may be gathered from those names.

In the sub-antral region it is possible to pass a curette deep under the labyrinth and to open diseased cells in this neighbourhood which lie above and around the jugular bulb and in the cerebellar fossa. But care must be taken in doing so not to injure the facial nerve or the bulb (see above, "*The Digastric Area*").

In treating of *the cerebellar zone*, which lies behind the sinus zone, Prof. Mouret laid stress upon the presence of tenderness on pressure in this region as an indication of bone infection. He had observed several cases in which this sign was present, and in which subsequent operation showed points of osteitis apart altogether from the existence of diseased pneumatic cells in the region. The typical point of tenderness in these cases lies two fingers' breadth behind external auditory meatus and above a horizontal line drawn through the base of the mastoid apex. If the tender point, at the same distance from the meatus, lies below this line, a lesion of the inferior or digastric region of the mastoid is indicated. From the cerebellar zone, also, infection of the soft parts of the neck may proceed with a "lardaceous" form of periostitis, and as the infection comes to that part of the surface which is covered by the insertion of the muscles, the tendency is for the production of one of the forms of Bezold's abscess.

Passing to *the apical zone* a warning was uttered against regarding the absence of tenderness at the mastoid tip as an indication of the absence of mastoiditis.

When the surgeon wishes to reach the inferior aspect of the mastoid the whole of the apex must be ablated.

In conclusion, the speaker gave a demonstration of certain anomalies and variations in the anatomy of the mastoid region.

DISCUSSION.

H. MYGIND (Copenhagen) asked in which cases Prof. Mouret opened the mastoid antrum through the auditory meatus, since it is impossible to tell beforehand whether an antrum is situated in the foetal position or not.

Prof. MOURET, in reply, said it was better to proceed in all cases as if the antrum were in that situation, since if it were not, the route of approach through the posterior meatal wall would nevertheless be certain to reach the antrum.

(To be continued.)

Abstracts.

PHARYNX.

Rolleston, J. D.—Local Treatment of Vincent's Angina with Salvarsan.

"Proc. Roy. Soc. Med.," November, 1913, Clin. Sect., p. 1.

Patient, aged twenty; admitted August 2, 1913. Fauces slightly infected, dirty deposit on right tonsil, numerous Vincent's organisms in smears. Throat culture negative for diphtheria. August 3: Well-marked ulceration of right tonsil. Various local measures tried. Applications of methylene-blue powder, syringing with potassium chlorate and lavender, painting with tincture of iodine, but the ulceration spread on to the palate and uvula, which became œdematous and covered with a dirty slough. Submaxillary adenitis appeared, there was sore throat, difficulty in swallowing and pain in both ears.

On August 17 all other treatment was omitted and a throat-swab moistened with glycerine was dipped in salvarsan powder and rubbed all over the affected area. August 18: Slough clearing off palate and uvula, sore throat and earache less, still numerous Vincent's organisms in smear. Second application of salvarsan. August 19: Third application. August 21: No Vincent's organisms in smear. August 25: Still an opaque area on upper part of uvula and soft palate. Fourth application. In twelve days' time throat quite normal. A short account follows of the use of salvarsan in Vincent's angina. It is preferable to use it locally as it gives better results than when injected intravenously.

Raymond Verel.

Leslie, F. A.—Tonsil Enucleation with the Wire without Preliminary Dissection. "The American Medical Compend.," December, 1912.

The author pleads for as little dissection as possible in the performance of tonsillectomy, and has been successful in removing the tonsils with the snare alone in 50 per cent. of the cases attempted. The operation, which may be done equally well under local or general anaesthesia, is performed with any good snare and tonsil forceps. For operative purposes the tonsils may be divided into ball-valved, partly protruding and deeply embedded tonsils. The first variety can be easily removed with snare alone; the two latter often require some preliminary dissection, but only enough to give the wire a place to start. In the case of embedded tonsils the gland must be everted before the wire is placed in position between the pillars. To insure proper eversion a good forceps is essential, and the tonsil must be seized in its middle with a *deep* and *narrow* bite. Traction is then made in that direction which produces most eversion; this is generally forwards. The advantages claimed are an absence of hæmorrhage during removal, less hæmorrhage after removal, more expedition in operating, and a shorter period of healing with less subsequent scar-contraction.

J. B. Horgan.

Kuhn, Franz (Berlin).—The Major Surgery of the Mouth (Tongue and Tonsil) without Division of the Jaw or Tracheotomy. "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

Kuhn reminds us of the unfavourable character of the statistics concerning operations for cancer of the tongue, and calls attention to the importance of an early diagnosis.

In cases of cancer of the back of the tongue and tonsil, Kuhn first uses Kocher's incision and clears out the glands and ligatures the vessels. For the second part of the operation Kuhn uses the thermo-cautery through the mouth. If possible, the second stage is carried out immediately after the first. The necessity for tracheotomy or laryngotomy is obviated by the use of the writer's peroral intubation apparatus.

In cases of cancer of the anterior part of the tongue Kuhn makes a crucial incision after Küttner's method and so clears out the submental glands. The article is illustrated by three anatomical plates.

J. S. Fraser.

NOSE.

De Roaldes, A. W., and Lynch, C.—The Preparation and Use of Thrombokinase. "New Orleans Med. and Surg. Journ.," September, 1912.

Thrombokinase is prepared by extracting the tissues (sheep's lungs) in sterile water. A precipitate is thrown down by treating with acetic acid; this is neutralised and twice evaporated to dryness after treatment successively with water and a solution of thymol in alcohol.

All experiments showed thrombokinase to be more active than any other agent in producing clotting. Three cases are given in which it was used:

Case 1.—A submucous resection in a patient suffering from hæmophilia.

Case 2.—A turbinectomy in a similar patient.

Case 3.—Removal of a large papilloma from the nose.

In these cases the application of thrombokinase rapidly arrested hæmorrhage when all other measures had proved unsuccessful.

Knoules Renshaw.

Citelli (Catania).—Large Primary Osteoma of the Frontal Sinus. "Annales des Mal. de l'Oreille, du larynx, du nez, et du Pharynx," vol. xxxix, No. 5.

November 1, 1911: A youth, aged fifteen, consulted the author with the following history: Ten months previously he noticed a swelling at the supero-internal angle of the right orbit, accompanied by lachrymation and suffusion of the conjunctiva. Several surgeons had been consulted, one of whom diagnosed a bony growth of the frontal sinus, perhaps in relation with the dura mater. On examination, a hard swelling, the shape and size of a nut, presented itself above the inner canthus of the right eye. The overlying tissues were normal and mobile. Vision unimpaired. Nothing pathological in the nasal fossa. The patient only complained of occasional slight pain and feeling of heaviness in the head. In view of the radiograph and physical signs, osteoma was diagnosed November 16. The author operated and found an osteoma almost completely filling the frontal sinus. The anterior and most of the inferior wall had been destroyed. As the neoplasm completely filled the sinus it could not be seized for detachment, and its density precluded its division into fragments. Removal was effected by introducing a scalpel between the growth and the posterior wall of the sinus and carefully levering it out. The cranial wall was found wanting over an area of a square centimetre, but the dura was intact. The tumour originated on the postero-

median part of the sinus floor over some ethmoidal cells which jutted into the sinus, hence the ease with which its point of insertion was fractured.

H. Clayton Fox.

Eckstein (Kattowitz).—Osteomyelitis of the Frontal Bone and Thrombosis of the Longitudinal Sinus. "Zeitschr. f. Laryngol.," Bd. v, Heft 2.

After a *resumé* of the literature of osteomyelitis following frontal sinus suppuration, Eckstein records a case of acute bilateral frontal sinusitis with suppuration in the left maxillary antrum. Male, aged fifteen, admitted August 1, 1911, with a history of pain for ten days in left frontal region. On admission, temperature 39° C.; great tenderness in left supra-orbital region; eyelids on left side swollen and conjunctivæ chemotic; protrusion of left eyeball; both middle turbinals swollen; pus from both frontal sinuses. Pus washed out of left antrum. Permission only obtained for removal of anterior end of middle turbinal and incision of subperiosteal abscess; foul pus evacuated and bare bone revealed. August 2: Right eye swollen; heart irregular; dulness at left base. August 4: High fever and somnolence; right eye proptosed. August 5: Permission obtained for further operation. Kuhn's intubation narcosis; second subperiosteal abscess at outer part of left orbit. Advanced osteomyelitis of frontal bone on left side; left sinus only the size of a cherry—it contained swollen blueish-red mucosa and stinking pus. Frontal process removed and left ethmoid and sphenoid cleared out. Typical Killian operation on right side—no osteomyelitis here. Death the same evening.

Autopsy (head only examined).—Purulent thrombosis of superior longitudinal sinus; extra-dural abscess on left side over frontal lobes; no meningitis. (Unfortunately the bacteriology is not stated.—*Abs.*) Of the fourteen cases of thrombo-phlebitis of superior longitudinal sinus collected by Eckstein, six had also osteomyelitis.

J. S. Fraser.

LARYNX.

Scripture, E. W.—Speech without a Larynx. "Journ. Amer. Med. Assoc.," May 24, 1913.

In the case reported, that of a man who had had his larynx removed with subsequent complete closure of the passage from the mouth to the trachea, speech was entirely absent. By employing some of the finer principles of phonetics and by teaching the patient to close his lips and compress the air in his mouth and pharynx by tension on the cheeks and in the back of the throat, the author succeeded in developing a speech that could be distinctly heard through two large rooms.

Birkett (Rogers).

Imhofer, R. (Prague).—Metastatic Abscesses in the Muscles of the Larynx in a Case of Pyæmia. "Zeitschr. f. Laryngol.," Bd. vi, Heft 2.

The case recorded by Imhofer is that of a child, aged fifteen days. The pyæmia was due to septic infection of the umbilical vein. The left knee-joint was the first to become swollen, but later the left hip and wrist joints and the right shoulder were also affected. At the *post-mortem*

pyæmic abscesses were found in the liver, lungs, heart, intestines, kidneys, muscles and bone-marrow. The pharyngeal and laryngeal mucosa was markedly injected. The *Staphylococcus pyogenes* was the infecting organism.

On microscopical examination Imhofer found an abscess in the substance of the thyro-arytænoideus internus muscle, and a vessel with necrotic walls was found opening into the abscess; this vessel had evidently been the seat of a septic embolus. Smaller abscesses were found in the other laryngeal muscles, and the case was evidently one of pure hæmatogenous infection of the larynx.

Similar infections have been described in smallpox, rheumatic polyarthrititis and gonorrhœa, and Albrecht has attempted to produce tubercular pyæmic abscesses of the larynx by injecting tubercle bacilli into the blood of animals. He at first got negative results even when he injured the laryngeal mucosa, and only succeeded when he ligatured the carotid above and below the thyroid artery, injected the part between ligatures with tubercle bacilli and then removed the lower ligature. Imhofer points out that the abscesses in his case differed from those in phlegmonous inflammation of the larynx and solitary abscess of the submucous tissue. In his case the abscesses were situated in the muscles while the submucous tissue remained free from inflammatory œdema.

J. S. Fraser.

ŒSOPHAGUS.

Thomson, Sir StClair.—Removal through the Mouth of a Tooth-plate impacted in the Œsophagus for 2½ years. "Lancet," January 4, 1913, p. 16.

Man, aged twenty-two, swallowed half a tooth-plate in May, 1908. Examination at a general hospital in July, 1908, and at a throat hospital in July, 1909, gave no apparent results. In August, 1909, a bougie was passed into the stomach, and, in view of this fact, œsophagotomy was refused. Later, his case was considered (at a general hospital) to be one of functional dysphagia. The tooth-plate was discovered finally at the London Throat Hospital, and it was triumphantly removed at King's College by means of Brünings' tube. The case is a most instructive one.

Macleod Yearsley.

EAR.

Storath, Emil.—The Resemblance of "Friedländer Otitis" to "Mucosus Otitis." "Arch. f. Ohrenheilk.," Bd. xciii, Heft I and 2.

[The full title of this paper is "The Relations of Friedländer Otitis to Capsulated Coccus Otitis, with a New Case of Otitis Media Acuta due to the Bacterium" (*sic*) "Pneumoniæ of Friedländer."]

Neumann and Ruttin have shown that when acute otitis media is due to a non-capsulated coccus the course run by the disease is typically as follows: The symptom-picture is characterised by a rapid rise in severity and a rapid decline by crisis when the tympanic membrane is opened. If a complication is to follow the symptoms do not quite disappear before it sets in, but gradually merge into those of the complication.

This contrasts markedly with the course of events when the *Strepto-*

coccus mucosus is the infecting organism. Then, after the membrane has been opened (and also when it remains intact), a gradual decline of symptoms occurs and an interval follows during which pain is absent and the only abnormal phenomena present are deafness and tinnitus. If paracentesis is performed nothing but mucus escapes and the opening made soon closes again. The whole incident may escape the patient's attention entirely. Finally, however, a complication suddenly sets in, and this is generally mastoiditis, a gravitation abscess, an extra-dural abscess, or less frequently meningitis or brain abscess.

A similar course, it has been observed, is taken by pneumococcus otitis in adults.

Storath, in the present article, shows, by an analysis of the cases reported in the literature and of a further case now for the first time recorded, that acute otitis media due to Friedländer's bacillus behaves very like mucosus otitis. There are some differences, however.

In the Friedländer type there is an acute onset followed by a long interval with deafness and tinnitus and then a complication suddenly appears. The complication is, however, more severe than in mucosus otitis. In both types about three months, on the average, elapses between the first onset of the disease and the appearance of the complication. In more than half of the cases the membrane did not rupture or there was an early cessation of the trifling discharge. The destruction of bone was less wide-spread than in mucosus otitis.

It is remarkable that in the four cases in which the nose was examined Friedländer's bacillus was also present in that cavity.

The author notes that most observers now agree that the assumption of a capsule protects the invading organism against the tissue defences and so induces it with an additional virulence.

Dan McKenzie.

Randall, A.—Operations for Mastoid Empyema and Caries. "Therapeutic Gazette," May, 1913.

The diagnosis between mastoid empyema and caries is of importance, as in the former condition operation is by no means always necessary, since, as a rule, acutely empyematous cavities can successfully drain by their natural channels. All the classic signs of mastoiditis may be absent if a carious affection is separated from the surface by a dense layer of bone. In such cases the line of least resistance is frequently inward. Caries of the inner table is often found, but it is doubtful whether this condition furnishes symptoms of its own. The list of signs given by many writers for extra-dural abscess are frequently quite absent.

Cases with chronic middle-ear suppuration are living over a powder magazine, but explosion is the exception; if, however, the case cannot be kept under observation, a radical attempt at cure is better than neglect. The rational surgery of this region demands evisceration of seriously diseased tissues as well as good drainage, but much can be done by the "*vis medicatrix nature*."

In all cases the mastoid antrum should be regarded as part of the tympanum and not as a mastoid cell. Cases of chronic otorrhœa are often due to cholesteatomata, and mastoid complications are comparatively rare. Cholesteatoma urgently requires relief, but this may be afforded conservatively; radical operation is not invariably indicated.

In a large percentage of cases when operation is required, Stacke's operation is sufficient to effect a cure. It is best done by laying the soft

tissues forward and chiselling away the upper back wall of the meatus from a point 10 mm. external to the drum-head.

Complete tympano-mastoid evisceration is indicated when there is evidence of grave mischief in the mastoid or neighbouring parts. External symptoms may not be marked, but deep-seated pain, fever, arrested discharge, high polymorphonuclear count, with, perhaps, rigors and vertiginous crises, plainly show the necessity for immediate action. Under these circumstances the operation should be prompt and thorough.

Knowles Renshaw.

Wood, J. Walker.—The After-treatment of Mastoid Operations. "Annals of Otology, etc.," xxi, p. 627.

Includes an analysis of results in 260 radical and 100 conservative operations. A long paper. Some of the author's conclusions are: (1) The sooner a chronic suppurating ear is operated upon the better is the chance of recovery. (2) That even a very chronic ear discharge can be cured. (3) Great deafness before operation is usually improved by it. (4) Slight deafness before operation is always made worse by it. (5) The quicker the healing the better the prospect of improvement in hearing. (6) Hearing depends on the adhesions and density of the scar-tissue about the round and oval windows. (7) Hearing is always worse if stapes injured at time of operation. We cannot agree that the Schwartz operation has "largely fallen into disuse since" Mr. Heath introduced as so-called conservative operation.

Macleod Yearsley.

Amberg, Emil.—Middle-ear Suppuration and Life Insurance. "Annals of Otology, etc.," xxi, p. 769.

The relation of chronic middle-ear suppuration to life insurance is by no means a simple question. Concerning radically operated cases, the decision is not very difficult. Non-operated cases require careful discrimination. It would seem that not all people with a chronic middle-ear suppuration should be excluded from life insurance, even if they have not been operated upon. The unilateral or bilateral diminution of hearing also enters into consideration.

Macleod Yearsley.

MISCELLANEOUS.

Borden, C. R. C. (Boston, Mass.).—Salvarsan in Lesions of the Nose and Throat. "Journ. Amer. Med. Assoc.," September 21, 1912.

The Boston City Hospital has had the most rapid and satisfactory results with the use of salvarsan in all syphilitic lesions of the nose and throat, with the exception of the larynx, which does not react so favourably to treatment. Any acute inflammation, other than luetic, of the eye, heart, kidneys or nervous system, contra-indicates its use.

Salvarsan is injected intra-venously, 0.9 to 0.6 gr. constituting a dose, followed by mercury and iodide in the ordinary doses. Sometimes 0.9 gr. is given in one dose, to be repeated in three months, but is not followed by a course of iodide.

Untoward symptoms were two deaths, some very sore arms, arsenic poisoning, panophthalmitis, and two cases of tinnitus with fulness in one ear and some decreased hearing, which cleared up after a few weeks.

Elizabeth

Birkett (Rogers).

Schlesinger, Ernst (Prof. Gerber's Clinic).—Results obtained with Neo-salvarsan in Cases of Luetic Affections of the Upper Air-Passages. "Zeitschr. f. Laryngol.," Bd. vi, Heft 3.

The writer states that in the early stages of syphilis they give mercurial injections in addition to injections of neosalvarsan, while in the later stages they combine the neo-salvarsan treatment with mercury or iodine.

Schlesinger calls attention to the greater solubility and ease of administration of neo-salvarsan over the older remedy. Details are given of nineteen cases of syphilis and six cases of non-specific affections due to spirochætæ other than the *Spirochæta pallida*.

Schlesinger considers that the ideal to be aimed at is a total dose of 2·4 to 3 grm. of neo-salvarsan spread over four injections, beginning with an injection of ·5 or ·6 of a gramme. The method used was that described by Dreyfuss in the *Münch. med. Wochenschr.*, 1913, Nr. 12. In no case did the patient collapse after the injection, but in six cases the reaction was severe, in three slight, and in nine the reaction was altogether absent. If a single dose is to be given Schlesinger recommends ·8 for men and ·6 for women. Great differences are noted in the effects of the injection as regards the rate of disappearance of signs of the disease and of the spirochætæ; for this the paper must be read in the original.

J. S. Fraser.

BRITISH MEDICAL ASSOCIATION.

EIGHTY-SECOND ANNUAL MEETING, ABERDEEN.

July 28, 29, 30 and 31, 1914.

SECTION OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

President: Harry Lambert Lack, M.D., F.R.C.S., London. Vice-Presidents: James Mackenzie Booth, M.D., C.M., Aberdeen; John Smith Fraser, M.B., F.R.C.S.E., Edinburgh; Albert Alexander Gray, M.D., F.F.P.S., Glasgow; Thos. Hillhouse Livingstone, M.D., F.R.C.S.E., Newcastle-on-Tyne.

The following subjects have been selected for special discussion:

Wednesday, July 29, 10 a.m.—Discussion: "The Treatment of Inoperable Growths of the Nose and Throat." (a) Diathermy, Mr. W. D. Harmer, London. (b) Radium, Dr. William Hill, London. (c) X Rays, Dr. John Macintyre, Glasgow.

Thursday, July 30, 10 a.m.—Discussion: "Otosclerosis." (a) Ætiology and Pathology, Dr. A. A. Gray, Glasgow. (b) Clinical Aspects, Mr. J. S. Fraser, Edinburgh. (c) Treatment: (1) Various Methods, Mr. G. J. Jenkins, London. (2) Auditory Re-education, Mr. F. F. Muecke, London.

Friday, July 31, 10 a.m.—Papers. *The following is also promised:* "Demonstrations of the Pathology of Labyrinthitis," Mr. J. S. Fraser, Edinburgh.

The Hon. Secretaries are: Oliver St. John Gogarty, M.D., 15, Ely Place, Dublin; John Francis O'Malley, F.R.C.S., 16, Weymouth Street, London, W.; Henry Peterkin, M.B., 17, Bon Accord Crescent, Aberdeen.

NOTES AND QUERIES.

The Erb Medal was awarded to Dr. Robert Bárány, of Vienna, at the recent meeting of German neurologists in Breslau.

A department for the treatment of Diseases of the Ear, Nose and Throat has been established at the Torbay Hospital, Torquay. Mr. T. G. Fenton has been appointed surgeon-in-charge.

ROYAL DEVON AND EXETER HOSPITAL.

It has been decided to initiate a Throat, Nose and Ear Department in this hospital, and the necessary accommodation is being provided in the out-patient department.

THE SEMON LECTURE, 1914.

Prof. Killian, of Berlin, will deliver the Semon Lecture at the Barnes Hall, Royal Society of Medicine, 1, Wimpole Street, London, W., on Thursday, May 28 next, at 5 p.m. Sir Felix Semon will occupy the Chair. Subject: "Suspension Laryngoscopy and its Practical Use."

The May meeting of the Section of Laryngology of the Royal Society of Medicine will be held on *Wednesday*, May 27, at 4 p.m.

THE COMBINED DINNER OF THE SECTIONS OF OTOTOLOGY AND LARYNGOLOGY OF THE ROYAL SOCIETY OF MEDICINE.

This dinner will be held on May 28 (the evening of the Semon Lecture) at the Trocadero Restaurant, Piccadilly Circus, London, W., at 7.30 p.m., Dr. D. R. Paterson (President of the Section of Laryngology) in the Chair.

Members who wish to attend are requested to send in their names as early as possible to one of the secretaries—Mr. G. J. Jenkins, 48, Wimpole Street, London, W., or Dr. E. A. Peters, 52, Wimpole Street, London, W.

BOOKS RECEIVED.

Bulletin et Mémoires de la Société de Laryngologie, d'Otologie et de Rhinologie de Paris. *Vigot Frères*, Editeurs, 23, Place de l'Ecole-de-Médecine, Paris, 1914.

Carbon Dioxide Snow: Its Therapeutic Uses. (Methods of Collection and Application.) By *J. Hall-Edwards*. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 1913.

Anæsthetics: their Uses and Administration. By *Dudley W. Buxton*, M.D. Fifth Edition. Enlarged. Pp. xiv + 477. Price 10s. 6d. net. London: H. K. Lewis, 1914.

Traitement des Sténoses Aiguës du Larynx. Par le *Dr. Guillermo Zorraquin*. Paris: Vigot Frères. Prix 2 francs.

Jahresbericht über die Fortschritte der Laryngologie, Rhinologie und ihrer Grenzgebiete. Herausgegeben von *Dr. F. Blumenfeld*, Wiesbaden. Preis 6 marks.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

HERPES ZOSTER OTICUS.

SIMPLE herpetic eruptions occurring in the course of pneumonia, or one or other of the infectious fevers, not infrequently appear on the auricle, but true herpes zoster of the ear is a decidedly rare condition, if we may judge from the scarcity of recorded cases (fifteen according to Jaehne; thirty according to Ramsay Hunt).

The common herpes zoster¹ of the trunk and limbs is an acute hæmorrhagic inflammation of the posterior root ganglia of the spinal nerves, probably microbic in nature. When the posterior ganglia of the cervical nerves are attacked, the auricle, as well as the neck, may become the seat of herpetic vesicles, in which case the herpes maps out the distribution of the great auricular nerve, as in the case reported recently by Dr. H. J. Davis.² Or, and this is the variety we are specially concerned with at the present moment—herpes on the auricle may be due to inflammation of the geniculate ganglion of the facial nerve, which is the root ganglion of the pars intermedia, the sensory constituent of the facial nerve, for the facial is, of course, not a pure motor nerve, and its geniculate ganglion is the analogue of the root ganglia of the posterior or sensory roots of the spinal nerves. It is to this variety that the name "otic herpes zoster" is applicable.

¹ "Zoster" (ζωστήρ, a belt) is strictly speaking a misnomer when applied to herpes of the auricle, but by a process of evolution familiar enough in medical terminology the word has come to be applied to all herpetic rashes due to inflammation of the root ganglia.

² "Proceedings Otological Section Royal Society of Medicine" (see p. 314 of this issue).

The distribution of the herpetic eruption in otic herpes zoster, as Ramsay Hunt has pointed out,¹ has not yet been exactly mapped out, but according to that observer's investigations, the areas liable to attack which correspond to the distribution of the sensory elements of the facial nerve include: the external auditory meatus, the concha, the anti-tragus, the anti-helix, the fossa of the anti-helix, and the lobule, and probably also the postero-mesial aspect of the auricle and the adjacent mastoid region. Further, a herpetic rash on the anterior two thirds of the tongue, corresponding to the chorda tympani, and in the peri-tonsillar region (probably corresponding to the great superficial petrosal nerve through Meckel's ganglion), may also be referred to the geniculate ganglion.

But our interest in geniculate herpes zoster does not end with a knowledge of the distribution and site of the eruption. Experience has shown that the herpetic rash and pains are frequently complicated with other and more serious nerve disturbances. Facial paralysis, for example, is generally present, as a result, doubtless, of the extension of the inflammatory process to the motor fibres of the seventh nerve. And what is of greater importance to us, the disease may attack the ganglia of the cochlear and vestibular nerves with consequent severe nerve-deafness and with vertigo, vomiting and nystagmus followed by a loss of the vestibular reactions in the affected ear. Moreover, although these paralytic phenomena may disappear, cases are on record² in which the facial paralysis and the deafness have remained permanent to a greater or lesser extent.

In another class of case the brunt of the disease seems to be borne by the Gasserian ganglion or by the ganglia of the upper cervical nerves, in which event the herpetic rash appears on the face or on the neck. Although in such cases the geniculate ganglion is only attacked *en passant*, so to speak, nevertheless, it is sufficiently affected to lead to facial paralysis.

This association of herpes zoster, primarily a sensory nerve-root affection, with motor paralysis, seems to be more common in geniculate herpes than in herpes zoster of the trunk and limbs—probably because of the close anatomical connection of the geniculate ganglion with the motor fibres of the seventh nerve—but even in the trunk and limbs muscular paralysis is by no means unknown.

Here, then, we have a disease which varies in severity from simple herpes of cutaneous and mucous surfaces up to wide-spread

¹ JOURN. OF LARYNGOL., RHINOL., AND OT vol. xxv, p. 405 *et seq.*

² A. Jaehne, p. 333 of this issue.

paralysis of important cranial nerves, always obstinate and sometimes permanent in character.

Finally, a point of great practical importance emerges when we come to consider the symptoms presented by the disease, a point alluded to by Prof. Urban Pritchard, in discussing Dr. H. J. Davis's case already mentioned. This is that the symptoms of otic herpes may closely simulate those of acute suppuration of the middle ear. In Dr. Pritchard's case the normal hearing showed that the auditory nerve had not been implicated, and this led to a correct diagnosis. But it would be easy to construct from the cases which have been recorded an imaginary case by which the otologist would be completely deceived unless his attention had been specially drawn to the possibility of confusion. The very rarity of geniculate herpes adds to the likelihood of such an error occurring.

A patient in the course of a feverish attack (let us call it "influenza") experiences severe deep-seated pain in one ear, which is followed after a few days by discharge from the meatus. In the meantime, deafness comes on and rapidly becomes absolute, along with the familiar and unmistakable signs of acute vestibular disturbance and with the appearance of facial paralysis. Here is all the story together with many of the signs of acute influenzal middle-ear suppuration with facial paralysis and labyrinthitis secondary to it. There are, it is true, a few herpetic spots on the auricle; the discharge from the meatus is serous, and not purulent unless the vesicles have become infected, and the membrana tympani, though reddened, is not bulging and is intact. But if the vesicles have become purulent and the meatus so swollen that the membrane cannot be satisfactorily inspected, and if, as is quite likely, the herpes on the auricle be mistaken for acute eczema, then the most experienced otologist might be forgiven if he made an error in diagnosis.

In such a case, however, a few vesicles on the tongue or palate, if present, would be sufficient to arouse our suspicions of otic herpes, and another point of great importance would be the behaviour of the temperature. In herpes the preliminary burst of fever is soon over, whereas in acute middle-ear suppuration with such severe complications the temperature would remain elevated.

No apology is needed for dwelling upon this aspect of the subject, for to operate upon the middle ear, and perhaps upon the labyrinth, in such a case as this would, of course, expose the patient to serious as well as to unnecessary risk.

REPORTS FOR THE YEAR 1913 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E, F.R.S.E.

PART V.

ACUTE SUPPURATIVE OTITIS MEDIA, PURULENT LABYRINTHITIS AND LEPTOMENINGITIS WITH- OUT RUPTURE OF THE TYMPANIC MEMBRANE.

By J. S. FRASER, M.B., F.R.C.S.,

Assistant-Surgeon, Ear and Throat Department, Royal Infirmary; Lecturer on Diseases of the Nose, Throat and Ear, School of Medicine of the Royal Colleges, Edinburgh; Aural Surgeon to Leith Hospital.

THE following case seems worthy of record, because it shows that a child may suffer from acute middle ear suppuration, acute purulent labyrinthitis and leptomeningitis without having any discharge from the ear—in other words, that the pus in the tympanic cavity may penetrate into the labyrinth through the round and oval windows and from the labyrinth may infect the subarachnoid space before the purulent exudate in the tympanic cavity bursts through the tympanic membrane.

The patient was a boy, aged twelve, who was admitted to Ward 32 under the charge of Dr. Edwin Matthew, in the absence of Sir Robert Philip. I am indebted to Sir Robert and Dr. Matthew for permission to record the case. Dr. Power, Resident House-Physician, kindly supplied the following notes of the case:

The boy was quite well till the morning of Monday (March 17, 1913), when he refused breakfast on account of severe earache, a general feeling of "seediness," and slight frontal headache. The patient's sister stated that the boy had pain in both ears, but his mother thought that the pain was only in the left ear.

The boy vomited at 11 a.m., although he had had no breakfast. The patient was put to bed and was visited by his doctor, who noted choreic movements of the hands.

Vomiting continued at short intervals until the following morning (March 18). After this it was not so constant, and the boy only vomited twice on March 19, and twice on the 20th, before admission to the Royal Infirmary.

The patient slept on and off during these first days of illness; he had frequent attacks of restlessness, and screamed if he were touched. At 1 p.m. on the day of admission (March 20) he lapsed into a semi-comatose condition.

Personal and Family History.—The patient had always been healthy and had had no previous ear trouble. His father died of consumption at the age of thirty-six. One brother, aged eighteen, committed suicide by cutting his throat three weeks before patient's illness began; this brother who suffered from tubercular cervical adenitis, had been despondent for some time on account of severe deafness due to chronic suppurative otitis media.

Examination of Patient.—(4 p.m. March 20). Temperature 102.4° F.; pulse 74; respirations 30. The boy is semi-comatose; pupils semi-dilated; conjunctival

reflex present. Conjugate deviation of eyes to the left. Patient is very restless and will not answer questions; he lies mostly on his right side, with knees and hips flexed. He moans constantly but there is no distinct cry. Any attempt at examination is resented. The patient waves his hands about in a choreic manner—thumbs pressed to palms. The head is not markedly retracted, but any attempt at flexion is resisted. Knee and ankle jerks present; no ankle clonus; Kernig's sign present; plantar reflexes indefinite.

There was no discharge from the ears and no definite tenderness over the mastoid processes. (Unfortunately the tympanic membranes were not inspected, and the writer (J. S. F.) had no opportunity of observing the patient in life; it is, however, evident that it would have been impossible to carry out any functional examination of the ears.) Both tonsils were large and red, the left more so than the right.

The abdomen was slightly tense but not scaphoid.

At 7 p.m. temperature had risen to 103.4° , the pulse to 116, and the respirations to 32. Chloral and bromide were given.

Lumbar puncture yielded milky fluid under considerable pressure; on standing a distinct layer of pus formed. Films of the pus showed many polymorphs and numerous capsulated diplococci, some in short chains. The report from the pathological department was to the effect that capsulated diplo-streptococci were present resembling pneumococci on culture.

11 p.m.—Patient very restless; temperature 103° . Heroin given. During the night temperature came down to 101° , but the pulse rose to 140 and the respirations to 36.

March 21.—Patient quite unconscious. Legs extended; deep reflexes absent; conjugate deviation has passed off.

5 p.m.—Cheyne-Stokes' respiration.

6 p.m.—Death.

POST-MORTEM REPORT.

(The writer is indebted to Dr. Murray Drennan for this report and also for the temporal bones.)

Brain.—Convolutions flattened; pus in subarachnoid space over both sides of cerebral cortex. Turbid cerebro-spinal fluid at base of brain and thick pus over the pons and in the interpeduncular space. Brain œdematous; small vessels congested; ventricles contain excess of turbid fluid. No thrombosis of venous sinuses.

Ears.—Mastoid cells on both sides filled with pus; mucous lining congested and thickened. The left inner ear was opened with the chisel and found to contain pus. The left internal auditory meatus was also full of pus. On the right side the middle-ear spaces contained pus, but the labyrinth on this side was free from purulent exudate.

Nose.—The mucous membrane of the ethmoidal and sphenoidal sinuses was congested, but these cavities contained no pus.

Spinal Cord.—Yellow purulent exudate present under the dura throughout the entire length of the cord; substance of the cord œdematous and congested. Films from the pus show many polymorphs and Gram + diplococci, some in short chains. (Dr. Drennan reports that on culture this organism showed the characters of the *Streptococcus mucosus*; there was a well-marked capsule when stained with the capsule stain.)

Lungs.—On the right side there were hæmorrhages in the pleura, emphysema

of upper and middle lobes, adhesions at right apex; bronchial glands enlarged and congested. On section the right lung showed intense congestion and small congested collapsed areas. The left lung showed a similar condition. Adhesions were present over the posterior surface. The trachea and large bronchi were greatly congested and the mucous membrane covered with blood-stained sero-purulent fluid.

Heart.—Right side enlarged; agonal thrombus in right ventricle and pulmonary artery. On the left side an agonal thrombus extended into the aorta.

Spleen and Mesenteric Gland.—Enlarged and deep pink in colour.

Liver and Kidneys.—Showed cloudy swelling.

MICROSCOPIC EXAMINATION OF THE LEFT EAR.

(From the histological point of view it is unfortunate that on both sides the middle and inner ears were opened at the *post-mortem* examination; on the left side the eighth nerve was removed. Enough, however, remained to show the condition of the middle and inner ears along with the paths of infection.)

External Meatus.—This is free from pus, but the lining membrane is swollen and the vessels engorged. The ceruminous glands show a dilated lumen.

Middle Ear—(1) *Eustachian Tube*.—The lining membrane of the tube is swollen and the submucous tissue densely infiltrated with small cells. This is especially noticeable at the point where the cartilaginous tube joins the tubal part of the tympanic cavity. Under a high power numerous pus-cells can be seen passing through the tubal epithelium into the cavity. It is interesting to note the difference between the contents of the Eustachian tube and those of the tympanic cavity; in the former the exudate consists largely of mucus with an admixture of pus-cells, whereas in the latter the exudate is entirely purulent. The superficial mucous membrane is, on the whole, well preserved in the tube, and the cilia can be distinctly seen. In places, however, the superficial epithelium is desquamating.

(2) *The Tympanic Cavity*.—The mucous membrane lining the attic is swollen, congested, and infiltrated, and the attic cavity itself is filled with pus. The head of the malleus and the body of the incus are normal, but the joint cavity between them contains pus (this may be an artefact caused by the opening of the tympanic cavity with the chisel—in the writer's opinion it is not an artefact).

In the middle part of the tympanic cavity the mucous membrane over the promontory is greatly thickened, and just in front of the oval window, where there is a slight exostosis of the promontory,

PLATE I.

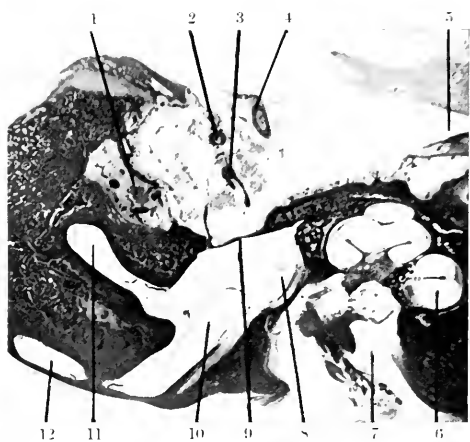


FIG. 1.—Horizontal section through normal left ear of infant, in region of oval window ($\times 3$ diam.). 1: Facial nerve; (2) long process of incus; (3) head of stapes; (4) handle of malleus attached to tympanic membrane; (5) Eustachian tube (tubal portion of tympanic cavity); (6) scala tympani of basal cochlear coil; (7) internal auditory meatus with eighth nerve; (8) sacculus; (9) foot-plate of stapes; 10, utricle; 11, smooth end of external canal; (12) crus commune.



FIG. 2.—Horizontal section through left ear of present case, about same level as Fig. 1 ($\times 3$ diam.). 1: External meatus with desquamated epithelium; (2) incus; (3) malleus; (4) facial nerve; (5) tubal portion of tympanic cavity—the latter contains pus; (6) basal coil of cochlea; (7) internal meatus; (8) ruptured sacculus; (9) utricle; (10) and (11) horizontal canal; (12) crus commune.

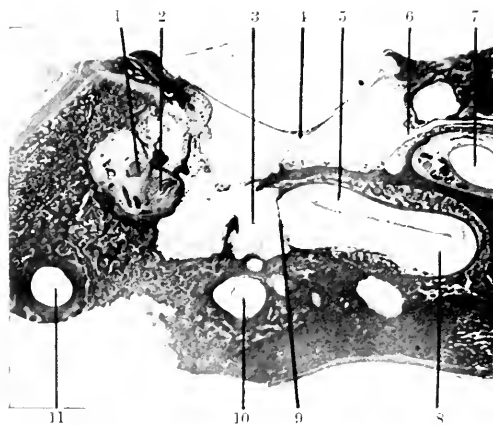


FIG. 3.—Horizontal section through normal left ear of infant, in region of round window ($\times 3$ diam.). 1: Facial nerve; (2) stapedius muscle; (3) niche of round window; (4) tympanic membrane; (5) scala vestibuli of basal coil of cochlea; (6) tubal part of tympanic cavity; (7) carotid artery in carotid canal; (8) scala tympani of basal coil; (9) membrane of round window; (10) ampullary end of posterior canal; 11, smooth end of posterior canal.

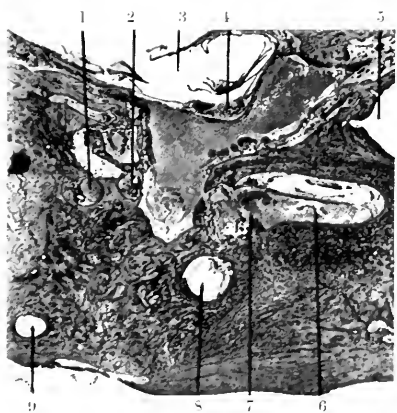


FIG. 4.—Horizontal section through left ear of present case, about same level as Fig. 3 ($\times 3$ diam.). 1: Facial nerve; (2) stapedius; (3) external meatus with desquamated epithelium; (4) thickened tympanic membrane—the tympanic cavity is full of pus; (5) carotid canal; (6) scala tympani of basal coil containing pus; (7) infiltrated membrane of round window; (8) ampullary end of posterior canal—the perilymphatic space shows a hemorrhage; (9) smooth end of posterior canal, normal.

TO ILLUSTRATE MR. J. S. FRASER'S PAPER ON ACUTE SUPPURATIVE OTITIS MEDIA, PURULENT LABYRINTHITIS AND LEPTO-MENINGITIS WITHOUT RUPTURE OF THE TYMPANIC MEMBRANE.

it is so œdematous and infiltrated as to form a long slender polypus which projects into the cavity. The whole of the tympanic cavity is filled with purulent exudate. The *tympanic membrane* is greatly thickened and the vessels are dilated, especially those which course between the epidermic and fibrous layers. The posterior part of the membrane bulges outwards towards the meatus, and, just external to the long process of the incus, this part is specially swollen and infiltrated. The epidermic layer is here seen to be desquamating and the fibrous layer is disintegrated by small cell infiltration. Pus-cells can be seen forming a small abscess just beneath the desquamating epidermic layer (myringitis). It is obvious that at this spot rupture of the membrane was just about to occur.

Ossicles.—Although the mucous membrane covering the ossicles is intensely congested and infiltrated like the rest of the tympanic mucosa, the ossicles themselves are healthy. The long process of the incus and the incudo-stapedial joint are normal, though these parts are the first affected as a rule—at least in cases of chronic suppuration—on account of their deficient blood-supply. The foot-plate of the stapes is normal, but the anterior part of the foot-plate is tilted outwards, while the posterior part is tilted in as if by powerful contraction of the stapedius muscle. *The annular ligament which joins the foot-plate of the stapes to the margins of the oval window is infiltrated with pus-cells, which are finding their way through it into the vestibule. This is especially noticeable in the anterior part of the ligament.*

The tympanic cavity, aditus, and antrum are all full of pus.

Labyrinth Capsule.—The labyrinth capsule proper, which is formed of cartilage bone, and contains interglobular spaces, is quite normal, but outside this the looser periosteal bone shows great vascular dilatation, and the marrow spaces surrounding the labyrinth capsule are intensely congested.

The facial nerve on the inner wall of the tympanic cavity appears normal, but the vessels which accompany it are greatly dilated.

Labyrinth—Cochlea.—All coils of the cochlea contain pus, but the scala tympani shows more than the scala vestibuli. In the basal coil the scala tympani shows a hæmorrhage in addition to very numerous pus-cells. The perilymphatic aqueduct contains pus at its cochlear end, but further down, where the duct becomes very narrow, few pus-cells can be seen. Towards the cranial end, however, numerous small round cells are again visible. In all the

coils the cochlear duct contains pus, and Corti's organ is disintegrated. In the middle and apical coils Reissner's membrane has disappeared, but in the basal coil it may be seen in parts. The hollow spaces of the *modiolus*, which contain the nerves and ganglia, are infiltrated with pus-cells, and the blood-vessels of the *modiolus* are greatly dilated; in the spiral canal of the basal coil hæmorrhage may be seen.

Round Window.—The secondary tympanic membrane closing the round window is greatly swollen and infiltrated with pus-cells, which may be seen making their way through it into the *scala tympani*. The mucous membrane lining the round window is greatly engorged and thickened.

Vestibule.—There is a considerable collection of pus in the perilymph space just internal to the foot-plate of the stapes. The endosteum covering the inner side of the foot-plate is thickened. The outer wall of the sacculæ is ruptured, and the sacculæ itself contains some pus-cells. The utricle is dilated but not ruptured. There is a hæmorrhage in the perilymph space of the vestibule between the utricle and the posterior wall of the cavity. The vestibular end of the endolymphatic aqueduct shows some small cell infiltration of its walls, and a few pus-cells may be seen in the cavity of the duct.

Semicircular Canals.—There is a hæmorrhage in the perilymph space of the external canal and in the *crus commune*, but the canals themselves are almost free from pus. The posterior canal also shows hæmorrhage in the peri- and endolymphatic spaces.

Internal Meatus.—The lower part of this space is seen to be full of pus-cells, but unfortunately the seventh and eighth nerves were removed at the *post-mortem*, so that no report can be given on these structures.

RIGHT EAR.

External meatus is free from purulent discharge.

Eustachian tube contains muco-purulent exudate.

Tympanic cavity is full of pus. The mucous membrane lining the tympanic cavity and attic is swollen, engorged, and infiltrated, but the joint between the malleus and incus is normal, as is also that between the incus and stapes. Pus is present in the niche of the oval window, but the *annular ligament* is intact and is not infiltrated with pus-cells. The mucous membrane of the aditus and antrum shows a similar condition to that of the tympanic

PLATE II.

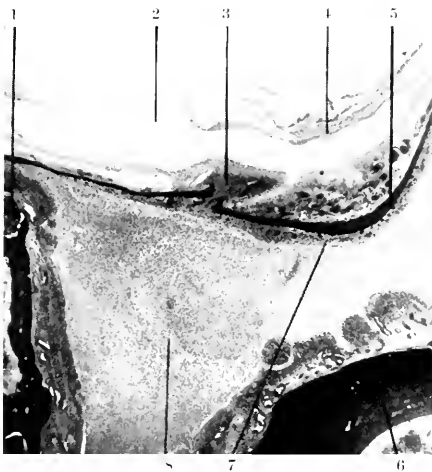


FIG. 5.—Horizontal section through left ear of present case ($\times 20$ diam.). 1 Chorda tympani; 2 external meatus; 3 collection of pus beneath epidermic layer of tympanic membrane myringitis—the fibrous layer is perforated; (4) desquamated epithelium of tympanic membrane; 5) fibrous layer of drum-head; 6) promontory, covered by swollen, engorged, and infiltrated mucous membrane; (7) mucous layer of tympanic membrane; (8) pus in tympanic cavity.

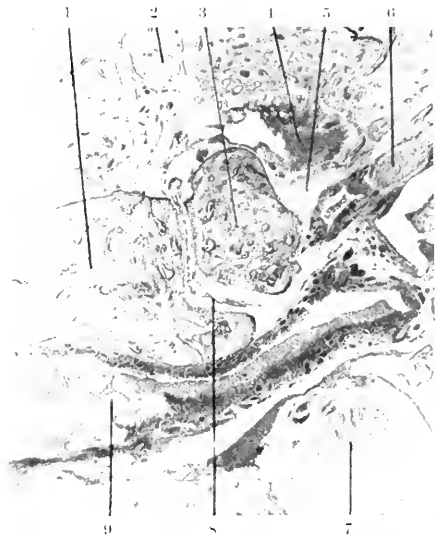


FIG. 6.—Horizontal section through left ear of present case ($\times 20$ diam.). 1 Incus; 2 bony wall of external attic; (3) malleus; 4 pus in external attic; 5) anterior ligament of malleus; 6) chorda tympani; (7) facial nerve—its bony covering is delinquent; 8) pus in joint between malleus and incus; 9) pus in internal attic.



FIG. 7.—Horizontal section through left ear of present case ($\times 20$ diam.). 1) Swollen mucosa over pyramid; (2) pus in niche of oval window; (3) footplate of stapes—to the right of this pus is seen entering the vestibule; 4) anterior crus of stapes; (5) internal meatus with pus cells (meningitis); (6) cavity of ruptured sacculus; (7) pus in perilymphatic space of vestibule; 8) pus and hemorrhage external to (9) the utricle.



FIG. 8.—Horizontal section through left ear of present case ($\times 20$ diam.). 1 Pus in tympanic cavity; 2) swollen mucosa over promontory; (3) pus in scala tympani of basal coil; 4) vein accompanying aqueduct of cochlea; (5) pus in cochlear opening of perilymphatic aqueduct; 6) pus in niche of round window—central part of the round window membrane is infiltrated with pus; (7) ampullary end of posterior canal.

TO ILLUSTRATE MR. J. S. FRASER'S PAPER ON ACUTE SUPPURATIVE OTITIS MEDIA, PURULENT LABYRINTHITIS AND LEPTO-MENINGITIS WITHOUT RUPTURE OF THE TYMPANIC MEMBRANE.

cavity. The *secondary tympanic membrane closing the round window is moderately thickened but is not infiltrated.*

Labyrinth Capsule.—As in left ear.

Cochlea.—There is a considerable amount of hæmorrhage in the scala tympani and also in the scala media in the neighbourhood of the round window. The cochlear opening of the perilymphatic aqueduct contains pus which has apparently found its way up the aqueduct from the subarachnoid space. In the basal coil the cochlear canal is somewhat dilated, apparently by the hæmorrhage which is present. A slight amount of coagulated lymph is present in the apical coil. Corti's organ in the apical coil is almost normal, but in the middle coil it is disintegrated and the membrana tectoria is separated. A hæmorrhage is present in the osseous spiral lamina of the basal coil. The modiolus and the nerve canals are infiltrated with pus, which appears to have invaded from the subarachnoid space of the internal meatus.

Vestibule.—There is a large hæmorrhage in the perilymphatic space of the vestibule between the foot-plate of the stapes on the outer side and the utricle and saccule on the inner. This hæmorrhage is situated below the entrance of the vestibular nerve to the utricle. (Unfortunately the right inner ear is not well filled with celloidin.) Hæmorrhage is present in the vestibular end of the endolymphatic aqueduct, but towards its cranial end the duct is healthy and the saccus contains no blood.

Semicircular Canals.—The superior canal is normal at its ampullary end, but the smooth end contains pus and chips of bone (artefact due to opening with chisel at *post-mortem*). There is a hæmorrhage in the crus commune in the membranous canal, and also in the nerve which passes to the ampulla of the posterior canal.

Internal Meatus.—A considerable quantity of pus is present in the internal meatus and surrounds the cochlear and vestibular nerves; this has probably infiltrated beneath the subarachnoid sheaths of the nerves from the meningitis which existed at the base of the brain. The fundus of the internal meatus is full of pus, and the modiolus is infiltrated to a moderate extent with pus-cells.

REMARKS.

(1) As appears from the *post-mortem* examination the case was one of acute infection of the respiratory tract—nose, trachea, bronchi, and smaller air-passages, and also of the middle-ear clefts

on both sides. The *Streptococcus mucosus* was found in the pus in the ears and also in the cerebro-spinal fluid.

(2) There is some evidence for believing that there was a tendency to severe disease of the ear in the patient's family. Lermoyez (*Abst. Central. f. Ohrenheilk.*, 1909, p. 497) cites two families in which several deaths occurred from intra-cranial complications following otitis media.

(3) It is interesting to speculate as to the outcome of the case if paracentesis had been performed early on the morning of March 17, when the illness began. Even then it would probably have been too late to avoid a fatal result, as signs of labyrinthitis and meningitis developed so rapidly.

(4) The choreic movements of the upper extremity are interesting. On admission to the Royal Infirmary the choreic movements of the hands were still present. Similar movements, combined with cerebellar rigidity, in a case of tubercular meningitis, have been recorded by Hughlings Jackson (*Brit. Med. Journ.*, 1875, p. 636).

(5) Unfortunately there is no note as to the presence or absence of cochlear symptoms in this case. The vestibular symptoms, though acute at the onset, rapidly diminished in severity, and the vomiting had almost passed off at the time of admission to the Infirmary. It was noted on admission that the patient lay on his right side and that the eyes were turned towards the left. In this position the nystagmus would be least. At this time the patient was almost comatose, and the position of the eyes corresponded to the direction of the slow movement of the vestibular nystagmus due to purulent disease of the left labyrinth.

(6) From a review of the literature (1903-1913) it appears that cases of labyrinthitis and meningitis occasionally occur in acute suppurative otitis media before rupture of the tympanic membrane. The present case, however, appears to be the first in which these conditions have been proved to be present by microscopic examination of the ear. Prof. G. Alexander, of Vienna, has privately informed the writer that he has a similar case, as yet unpublished.

(7) The route of infection from the tympanic cavity to the labyrinth appears to admit of no doubt, from the examination of the round and oval windows of the left ear. From the labyrinth the infection appears to have spread along the perilymphatic aqueduct to the subarachnoid space, giving rise to meningitis. The

PLATE III.

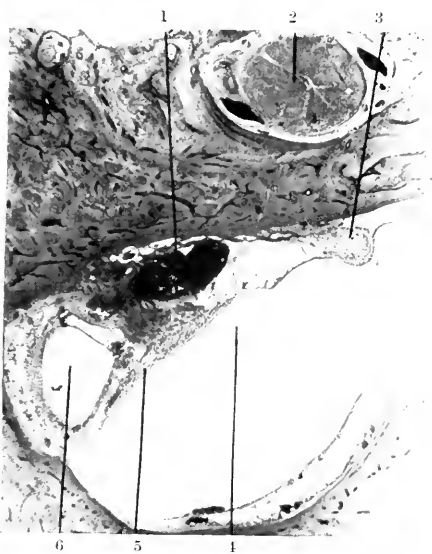


FIG. 9.—Horizontal section through *right ear* of present case ($\times 20$ diam.). (1) Hemorrhage in perilymphatic space of vestibule close to utricular branch of vestibular nerve; (2) facial nerve; (3) crista of external canal; (4) cavity of utricle, which contains an air-bell artefact; (5) neuro-epithelium of utricle; (6) cavity of saccule.



FIG. 10.—Horizontal section through *right ear* of present case $\times 20$ diam.. (1) Hemorrhage in perilymphatic space of vestibule external to saccule; (2) pus in niche of oval window; (3) foot-plate of stapes; (4) hemorrhage in posterior part of perilymphatic space of vestibule—the latter contains a large air-bell; (5) utricle, containing air-bell; (6) hemorrhage; (7) ductus endolymphaticus; (8) cavity of saccule.



FIG. 11.—Horizontal section through *right ear* of present case ($\times 20$ diam.). (1) Cochlear duct of basal coil containing hemorrhage; (2) air-bell in scala vestibuli; (3) spiral ganglion; (4) hemorrhage in bony spiral lamina; (5) air-bell in scala tympani.



FIG. 12.—Horizontal section through *right ear* of present case ($\times 20$ diam.). (1) Scala tympani of basal coil; (2) hemorrhage above membrane of round window; (3) niche of round window; (4) swollen membrane of round window; (5) pus in cochlear opening of perilymphatic aqueduct; (6) vein accompanying cochlear aqueduct.

infection may also have spread along the branches of the cochlear nerve to the subarachnoid space of the internal meatus, as the left modiolus was infiltrated with pus.

(8) In some ways the condition of the right ear is even more interesting than that of the left. There is still considerable difference of opinion as to the pathological conditions present in the first stages of labyrinthitis. Many suppose that at first there is a serous exudation into the perilymphatic space, while others believe that hæmorrhage occurs. In the right ear of the present case there was a little curdled lymph to be seen in the apical coils of the cochlea, but the most marked changes were the hæmorrhages which were seen in the perilymphatic space internal to the foot-plate of the stapes and, to a less extent, just above the secondary tympanic membrane. On this side the annular ligament and the membrane of the round window were not infiltrated with pus, and it would therefore appear that the hæmorrhages were of toxic origin. The condition of the right ear (numerous hæmorrhages) may possibly account for those cases of marked deafness which sometimes follow severe attacks of acute suppurative otitis media. It must not be forgotten, however, that pus was present in the scala tympani of the basal coil in the cochlear end of the perilymphatic aqueduct. This had undoubtedly found its way up the aqueduct from the subarachnoid space. The writer has found hæmorrhages, similar to those in the present case, in the mucous membrane of the sphenoidal sinus in a case of acute pneumococcic infection.

(9) Cases are on record in which labyrinth suppuration appears to have been due to retrograde infection from the subarachnoid space. This not infrequently occurs in epidemic cerebro-spinal meningitis. The present case cannot be regarded as one in which the labyrinth has been infected by this route, at least on the left side. On this side the otitis media is much more advanced than the labyrinthitis, and the state of the windows shows that the pus is passing into, and not out of, the labyrinth.

(10) The presence of pus in the joint between the incus and malleus on the left side is probably not an artefact; both middle ears were opened with the chisel, and yet only on the left side does the incudo-malleal joint contain pus.

(11) The early stages of perforation of the drum-head are well illustrated in the left ear of the present case. The whole tympanic membrane is thickened, engorged, and infiltrated. The fibrous layer is ruptured and a small abscess has formed just underneath

the superficial epithelium, which is desquamating. Had the patient lived for a few hours longer, discharge from the ear would probably have occurred.

(The writer wishes to acknowledge his indebtedness to the Carnegie Trust for a grant in connection with the photo-micrographs illustrating this case.)

Review of the Recent Literature dealing with Acute (genuine) Suppurative Otitis Media and Labyrinthitis.

I. *Types of Otitis Media.*

Brock (*Zeitsch.f. Ohrenheilk.*, B. 67, p. 1) divides acute suppurative otitis media into two groups: (1) A *genuine* form, following coryza, influenza, etc.; and (2) a necrotic form which occurs in scarlet fever and tuberculosis. Brock has collected thirty cases of acute genuine otitis media, in which labyrinthitis developed. In eight of these cases infection spread to the labyrinth by way of the oval and round windows, and in six of these the windows were macroscopically intact, the infection spreading through the mucous membrane and ligamentous structures without causing an actual rupture. This mode of infection is known as "induced" labyrinthitis, and to this group the present case belongs.

Ruttin (*Medizin. Klinik.*, 1910, No. 1) divides acute otitis media into two groups: (1) due to non-capsulated organisms (*Streptococcus pyogenes* alone or along with a staphylococcus); (2) due to capsulated organisms (pneumococcus and *Streptococcus mucosus*).

(1) In otitis due to non-capsulated organisms the *first* stage (serous exudation) begins with stinging pain in the ear, which increases for three or four days. At the end of this period the *second* stage (purulent exudate) begins, and the membrane gives way; pain passes off, but there is copious purulent secretion, deafness and tinnitus. This stage lasts about two weeks. In the *third* stage, which also lasts about two weeks, the secretion is mucopurulent, the hearing improves and the noises diminish. In the *fourth* and last stage the discharge stops and the membrane shows the picture of a simple catarrhal otitis. Later it becomes retracted and opaque. There is moderate deafness and tinnitus in this stage, and the patient has a "closed up" feeling in the ear.

(2) In the variety due to capsulated organisms the *first* stage begins with slight pain in the ear, deafness and noises. The drumhead appears as in serous catarrh—opaque, moist, dull and

desquamating, but only slightly red. The membrane is not bulged, and details of the malleus are still visible, though the incus cannot be seen. In the *second* stage (after one or two weeks) the slight symptoms get less, but the patient complains of a heavy feeling in the head, slight deafness and noises. These symptoms may remain for weeks or even months. On examination it is found that the tympanic cavity has somewhat recovered, and that the light reflex is present though not sharp; there is slight mastoid tenderness, and if paracentesis is performed mucoid secretion is evacuated. The *third* stage develops suddenly with signs of intra-cranial complication. In many instances, however, the third stage never develops and the otitis aborts.

Neumann and Ruttin (*Archiv.f. Ohrenheilk.* B. 79) have recorded 79 cases of acute suppurative otitis media. Of these, 54 cases were cured without operation, three showing capsulated cocci and 51 non-capsulated cocci. Forty-three cases came to operation, 14 with capsulated cocci and 29 with non-capsulated cocci. Out of 24 cases, in which the streptococcus was present, alone or in mixed growth, 22 came to operation and only two recovered spontaneously. Of the 22 cases operated upon, two showed extradural abscess, one meningitis, one brain abscess, and five Bezold's mastoiditis. Operation showed that great destruction of bone had taken place, although there had been comparatively few symptoms.

Of the 34 cases in which the *Streptococcus pyogenes* was present, 20 cured spontaneously and only 14 came to operation.

In the present case, although the *Streptococcus mucosus* was the organism present in the middle ear and subarachnoid space, the type of otitis was very different to that described above, unless we are to assume that the patient had been suffering from a latent otitis media due to the *Streptococcus mucosus*, and that it was only the sudden onset of labyrinthitis and meningitis from which the boy's relations dated the onset of the illness. To the writer this supposition seems an extremely probable one.

Hays (*Annals of Otology*, June, 1912) records a case of acute mastoiditis in a child. Twenty-four hours after operation the temperature rose to 103° F., the pulse became irregular and nystagmus developed to the diseased side. Lumbar puncture yielded cloudy fluid containing the *Streptococcus mucosus*.

Neumann and Ghon (*Centralbl. f. Ohrenheilk.*, 1910, p. 276) report on the bacteriology of 56 cases of purulent meningitis; they found that a diplococcus and the *Streptococcus mucosus* were the usual causes of this intra-cranial complication. This is remark-

able in view of the fact that Neumann and Ruttin had found the streptococcus pyogenes in sixty out of ninety cases of acute suppurative otitis media.

II. *Acute Suppurative Otitis Media and Labyrinthitis.*

In the *Monatsschrift für Ohrenheilkunde*, Jahrgang 47, Heft 5, Ruttin records ten cases of acute suppurative otitis media and labyrinthitis and has also collected twenty-nine further cases from the literature as follows:

Brock (4 cases), *Zeitschr. f. Ohrenheilk.*, Bd. lxvi; Blohmke, *ibid.*, Bd. lxiv; Gruenberg (two cases), *ibid.*, Bd. lxii and lxiii; Knapp, *Festschr. f. Lucae*, Berlin, 1905; Lange (two cases), *Passow's Beiträge*, Bd. i, cases 8 and 9; Marx, *Zeitschr. f. Ohrenheilk.*, 1910; Nernberg, *Archiv. f. Ohrenheilk.*, Bd. lxxvi; Panse, *Verhandl. d. Deutschen Otolog. Gesellschaft*, 1910; Politzer, *Archiv. f. Ohrenheilk.*, Bd. lxxxv; Scheibe, *Verhandl. d. Deutschen Otolog. Gesellschaft*, 1909; Schmiegelow, *Archiv. f. Ohrenheilk.*, Bd. lxxix, cases 2 and 10; Schoetz, *ibid.*, Bd. lxxxvi; Schwabach, *Lucae's Festschrift*, 1905; Uffenorde (2 cases), *Verhandl. d. Deutschen Otolog. Gesellschaft*, 1910, and *Passow's Beiträge* Bd. v, Heft. 4; Voss (5 cases), *Verhandl. d. Deutschen Otolog. Gesellschaft*, 1908; Wanner, *ibid.*, 1909; Wojatschek, *Archiv. f. Ohrenheilk.*, Bd. lxxxv; Shim-isi-Ziba, *ibid.*, Bd. lxxxvii, 1912.

The age of the patients is not stated in every case, but at least nine were children of 15 years and under. *Duration*.—In at least nineteen of the cases the duration of the otitis media, up to the occurrence of labyrinthitis was eight days or less; in several of the cases the otitis media and labyrinthitis appeared to be simultaneous. *Exudate*.—In twenty cases the tympanic exudate was purulent or muco-purulent, but in at least four it was only blood-stained serum. *Bacteriology*.—In three cases at least capsulated diplococci were present. *Hearing*.—Eight of the patients at least had some remains of hearing in the affected ear. *Result*.—Sixteen of the patients recovered and twenty-three died. In at least nineteen of the twenty-three deaths leptomeningitis was present; in one case there was no *post-mortem*.

In one case recorded by Brock (*Zeitsch. f. Ohrenheilk.*, Bd. lxvi) the labyrinthitis was of the induced variety, *i. e.* there was no macroscopic lesion of the round or oval windows or of the bony walls of the labyrinth.

In Case 3 of Ruttin's series the tympanic membrane was not

perforated, but showed scar due to former suppurative otitis; the case recovered. The writer has searched the literature for the last eleven years and can find no case exactly similar to that described in the present paper. Prof. Alexander and Dr. Ruttin, of Vienna, and Dr. Nager, of Zurich, have all been kind enough to inform the writer that they know of no similar case hitherto recorded.

Ruttin (*ibid.*) states that labyrinthitis can occur (1) in the stage of serous exudation in otitis media. Of the 39 cases collected by Ruttin, 13 come into this group (8 cured, 5 died). (2) Labyrinthitis may occur in the stage of purulent middle ear exudation a short time after the perforation of the tympanic membrane; 7 of the 39 cases collected by Ruttin belong to this group, 3 cured, 4 died. (3) Labyrinthitis may occur one to three weeks after perforation; 5 of the 39 cases belong to this group (1 cured, 4 died). (4) Finally, labyrinthitis may occur in cases of occult otitis media due probably to capsulated diplococci; of the 39 cases collected by Ruttin, 14 belong to this group and of these 3 were cured and 11 died.

In group 1 the labyrinthitis and otitis were almost simultaneous. The middle ear exudate consists of blood-stained serum or, if it be purulent, the tympanic membrane is not perforated. In this group, of the five cases which died the cause of death was almost certainly labyrinthine meningitis in four. One case died of pneumonia and on examination a healing purulent labyrinthitis was found. Of the eight cases which recovered, seven were cases of serous labyrinthitis and one case was not sufficiently investigated.

Group 2.—Of the four recoveries, three were cases of serous labyrinthitis, while in one purulent labyrinthitis was present. Purulent labyrinthitis was present in all of the three cases which died.

Group 3.—The case which recovered was one of serous labyrinthitis, while all the four deaths were associated with purulent labyrinthitis.

Group 4.—Of the three recoveries, one was serous and two were purulent labyrinthitis; while of the eleven cases which died, only one showed serous labyrinthitis, the rest were purulent.

If we gather these results together we find that there were fourteen cases of diffuse serous labyrinthitis, of which thirteen recovered and one died. On the other hand, there were twenty-five cases of purulent labyrinthitis, of which four were cured and twenty-one died.

Ruttin comes to the conclusion that if a labyrinthitis occurs

early in the course of a genuine acute otitis media, it is more likely to be serous and consequently less dangerous. If on the other hand, the labyrinthitis occurs late it is more likely to be purulent and therefore dangerous. Ruttin admits, however, that a dangerous purulent labyrinthitis may occur very early in a case of otitis media, and further, that meningitis may develop before labyrinthitis, and may give rise to a retrograde labyrinthitis by infection through the internal meatus.

The present case cannot be regarded in this light, because the otitis media is much more marked than the labyrinthitis. Further, the condition of the windows shows that the pus is passing into and not out of the labyrinth.

It is noteworthy that in the fatal cases collected by Ruttin, in which otitis media, labyrinthitis and meningitis all developed about the same time, five showed capsulated cocci as the causal organism, and of these three showed the *Streptococcus mucosus*.

The following cases do not appear to be included in Ruttin's list:

Manasse, *Centralbl. f. Ohrenheilk.*, 1903, p. 436.—Case of sub-acute otitis media and labyrinthitis with infection through the annular ligament.

Dixon (*Archives of Otology*, 1905). Acute suppurative otitis media of six weeks' duration. Sudden attack of labyrinthitis, probably due to dislocation of stapes during examination of the ear with probe: meningitis and death. Examination showed that the stapes was dislocated and that pus was present in the vestibule and canals. The membrane of the round window was perforated.

Whitehead (*Journal of Laryngology*, 1904) records twenty-seven cases of labyrinthitis. One of these was in a case of acute suppurative otitis media in a child of three months.

V. Wild (*Centralbl. f. Ohrenheilk.*, 1909, p. 576) reported a case of acute suppurative otitis media in which labyrinthitis occurred on the third day.

Herzfeld (*Centralbl. f. Ohrenheilk.*, 1900, p. 463). Case of acute suppurative otitis media with labyrinthitis, with cure after the Schwartze operation. Katz stated that he had had a similar case and thought that these cases were explained by inflammatory œdema of the labyrinth and not by hæmorrhage.

Gradle (*Laryngoscope*, 1909). Case of acute influenzal otitis media of four weeks' duration, followed by labyrinthitis. The patient recovered with normal hearing.

Meyer (*Centralbl. f. Ohrenheilk.*, 1910, p. 320) records a case of purulent meningitis and pneumonia in a child of six months.

Curdled lymph was present in one labyrinth and streptococci were found in the aqueduct of the cochlea and in the scala tympani of the basal coil. Meyer holds that the labyrinth became infected through the aqueduct of the cochlea.

Meyer also records a case of labyrinthitis in a child two days old which died of pneumonia. In this case there was a streptococcal blood infection, and Meyer believes that the labyrinth was infected in this way.

Emil Storath (Abstract, JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1914, p. 276) points out the similarity of otitis media due to Friedländer's bacillus to that caused by the *Streptococcus mucosus*, both as regards symptoms and intra-cranial complications.

III. *Acute Suppurative Otitis Media and Labyrinthitis, without Rupture of the Tympanic Membrane.*

Ruttin (*Centralbl. f. Ohrenheilk.*, 1912, p. 30) records the case of a child, aged nine, who had had earache for two days. Vomiting, giddiness and loss of balancing were present before admission. The drum-head was bulged and red, but not perforated. The affected ear (right) was quite deaf, and the caloric reaction was absent. Spontaneous nystagmus to the left was present. Paracentesis evacuated serous exudate. The nystagmus passed off in six days, but the otorrhœa remained very copious. The patient recovered, but the right inner ear remained functionless. E. Urbantschitsch stated that he had seen a similar case.

Ruttin (*Centralbl. f. Ohrenheilk.*, 1912, p. 212) records a further case: Child, aged ten, with severe headache and earache on the right side for one day; giddiness and vomiting; right drumhead red and swollen, but showed a retracted scar. Right ear deaf; spontaneous nystagmus to the left (third degree); caloric reaction absent on right side. Tenderness present over cervical spine; dermatographia. Cerebro-spinal fluid clear but under increased pressure. The patient recovered after the radical operation, and the hearing in the right ear returned to some extent; the caloric reaction became normal. The case was evidently one of severe serous labyrinthitis.

IV. *Meningitis before Perforation of the Membrana Tympani.*

Dr. Logan Turner has kindly given the writer notes of two private cases: (1) Female, aged eight; acute suppurative otitis

media (right), mastoiditis and pneumococcal meningitis; death. The right drum-head was inflamed but not perforated. On examination shortly before death there was nystagmus to the left: high fever, dilated pupils, retraction of the head with Kernig and Babinski's signs on both sides. The cerebro-spinal fluid was turbid and yielded a pneumococcus on culture.

(2) Female, aged seven, with acute suppurative otitis media on the left side. There was slight redness of the drum-head but no perforation. Mastoid tenderness was absent, but the patient suffered from headache, vomiting, restlessness and increasing drowsiness. The temperature was high and there was photophobia, rigidity of neck and double Kernig. The cerebro-spinal fluid was turbid and yielded a pneumococcus on culture. As there was no *post-mortem* examination in these cases, it is not possible to state the route of infection.

V. *Route of Infection from Middle Ear to Labyrinth.*

Brock (*Zeitschr. f. Ohrenheilk.*, Bd. lxvii) gives the following routes: (1) Oval window; (2) round window; (3) erosion of outer wall of external canal; (4) erosion of posterior or superior canal by extra-dural abscess; (5) erosion of bone of outer wall of cochlea from disease of air-cells around the Eustachian tube; (6) erosion of outer wall of promontory.

Trétrôp (*Centralbl. f. Ohrenheilk.*, 1910, p. 169) gives the following order of frequency: Oval window, round window, horizontal canal, promontory, subarcuate fossa, vertical canals, and, finally, the apex of the cochlea in the tubal region.

Manasse (*Zeitschr. f. Ohrenheilk.*, Bd. xlix, p. 109) mentions four cases of acute suppurative otitis media with labyrinthitis. In two infection occurred through the annular ligament, while in one it was due to fracture of the petrous pyramid. In the remaining case the route is not mentioned.

Kümmel (*Zeitschr. f. Klin. Med.*, Bd. lv, p. 373) records a case of acute suppurative otitis media and labyrinthitis due to influenza. A fistula was present in the external canal and the stapes was absent.

Goerke (*Archiv. f. Ohrenheilk.*, Bd. viii, p. 1) records a case of isolated infection of the tip of the cochlea—a very rare condition.

E. Urbantschitsch (*Centralbl. f. Ohrenheilk.*, 1912, pp. 162 and 218) records two cases of post-operative labyrinthitis following operation for acute suppurative otitis media. In the first there

was a fistula in the external canal, and, in spite of a radical operation, followed later by Neumann's labyrinth operation, the patient died. The second case recovered after Neumann's operation in spite of signs of meningitis—stiffness of neck and nystagmus to diseased side.

Zange has shown that vascular communications exist between the middle ear and labyrinth in the regions of the horizontal canal and round window.

The present writer has, during the last eight years, microscopically examined six cases in which labyrinth suppuration followed acute purulent otitis media. The routes of infection were as follows: Oval and round windows (the present case); round window alone, one case; erosion of external canal, one case; erosion of bone of promontory, one case; infection of scala tympani of basal coil from the subarachnoid space (meningitis) along the aqueduct of the cochlea, one case; path of infection not accurately determined, one case.

It is rather surprising that infection does not find its way oftener through the secondary tympanic membrane into the basal coil of the cochlea. Possibly the fact that the membrane of the round window lies at the top of a funnel-shaped niche may account for its escape. On the other hand, it is quite possible that the round window is more frequently attacked than we suppose, especially in infants. If this be so it would account for many of the cases of severe deafness following middle-ear suppuration, and probably also for numerous cases of deaf-mutism.

VI. *Varieties of Labyrinthitis.*

Witmaack (*Centralbl. f. Ohrenheilk.*, 1911, p. 275) recognises two forms: (1) Induced labyrinthitis without erosion of bone or purulent infiltration of the annular ligament or round-window membranes; this form is usually serous or sero-fibrinous. These cases are diffuse and lead to complete loss of labyrinth function, but not to meningitis. (2) Labyrinthitis caused by suppurative otitis with disturbance of continuity or purulent infiltration of the window-niches leading to the labyrinth. This second form has two subdivisions: (a) There may be a sudden breaking in to the perilymphatic space, often caused by trauma, *e. g.* injury of the canals or stapes laxation. These cases are mostly diffuse and lead rapidly to fatal meningitis. The prognosis is unfavourable as we are seldom in the position to operate before meningitis has occurred.

Witmaack records a case in which at most two hours previously labyrinthitis had occurred, and yet there was intense cloudiness of the cerebro-spinal fluid which contained streptococci in pure culture. (b) In this sub-group the spread of inflammation is more gradual, and there is formation of fibrinous exudate and adhesions in the perilymphatic space. There may either be erosion of the bone of the labyrinth capsule or labyrinth necrosis. In the (b) group meningitis is much more rare, and a cure may be obtained after the radical mastoid operation without the labyrinth operation, which should not be performed unless signs of meningitis occur after the radical mastoid operation.

Brock (*Zeitschr. f. Ohrenheilk.*, Bd. lxxvii) divides cases of labyrinthitis, due to genuine acute middle-ear suppuration into two groups: The labyrinthitis comes on almost simultaneously with the otitis media, the infection occurring through the windows; (2) the labyrinthitis occurs after the suppurative otitis has been present for some weeks or months; in these cases the infection is due to bone disease.

Voss (*Centralbl. f. Ohrenheilk.*, 1908, p. 437) states that in genuine otitis media the labyrinthitis is often serous—circumscribed or diffuse. He holds that manipulation of the labyrinth wall at operation is responsible for many cases of serous labyrinthitis.

Ruttin (*Centralbl. f. Ohrenheilk.*, 1912, p. 543) has observed three cases of loss of labyrinth function without symptoms. The vestibular reaction was present at the first dressing but was absent afterwards.

Herzog (*Centralbl. f. Ohrenheilk.*, 1908, p. 163) states that in suppurative otitis media the labyrinth is affected by collateral œdema in the same way as the tissues surrounding a furuncle.

E. Urbantschitsch (*Centralbl. f. Ohrenheilk.*, 1910, p. 194) gives a case of serous labyrinthitis and facial paralysis after a radical mastoid operation. He considers that both conditions were probably due to collateral inflammatory œdema. Herzfeld and also Katz (*Centralbl. f. Ohrenheilk.*, 1909, p. 463) records similar cases.

Herzog (*Centralbl. f. Ohrenheilk.*, 1910, p. 414) has succeeded in experimentally producing localised labyrinthitis in animals by opening the external canal. Subsequent microscopic examination showed that the vestibule and cochlea were normal.

Ruttin (*Passow's Beiträge*, Bd. i, p. 388) states that labyrinthitis due to infection of the external canal or oval window may be confined to the canals and vestibule or may only extend to the scala

vestibuli at the beginning of the basal coil of the cochlea. In the same way, if infection passés through the round window the inflammatory exudate may be confined to the lower part of the scala tympani of the basal coil. Mayer (*Zeitschr. f. Ohrenheilk.*, Bd. lv, p. 48) has shown the same thing by animal experiments. The same writer (*Centralbl. f. Ohrenheilk.*, 1909, p. 585) records a case of acute otitis media and labyrinthitis in a man aged sixty. Gram-positive cocci were found in the fibrinous exudate. Microscopic examination showed fibrinous labyrinthitis on the inner side of the round window. This case proves that labyrinthitis may be due to diffusion of bacterial products through the window membrane in genuine otitis media, as well as in scarlatinal otitis. Schwabach (Lucae's *Festschrift*, p. 55), records a case of acute suppurative otitis media, in which the tympanic membrane had healed, although labyrinthitis was present and the oval window perforated. Dr. Logan Turner and the present writer have had a somewhat similar case.

Ruttin (*Centralbl. f. Ohrenheilk.*, 1913, p. 528) records a case of sub-acute influenzal otitis (left) with superficial abscess and sagging of the meatal wall; giddiness, vomiting and headache were present before admission, but there was no fever. The left ear was deaf but the caloric reaction was present, though diminished. At the operation, sequestra were found and the whole petrous pyramid was removed. The patient died and microscopic examination of the labyrinth showed a fistula in the external canal and pan-labyrinthitis. The oval window was also broken through. It thus appears that the labyrinth may contain pus though the caloric reaction is present.

VII. *Frequency and Mortality of Labyrinthitis.*

Labyrinthitis, in the course of acute and chronic middle ear suppuration is probably much more common than is supposed. Reliable statistics as to the frequency of past and present labyrinthitis can only be obtained when all cases which are suffering from (or have suffered from) suppurative otitis media, are submitted to a thorough functional examination of the cochlear and vestibular apparatus. Friedrich's statistics ("Die Eiterung des Ohrlabyrinths." Wiesbaden, 1905, p. 13) show that one case in every hundred of suppurative otitis media has a labyrinth suppuration. It would be very interesting if some worker in possession of a large clinical material would thoroughly examine several hundred

consecutive cases of chronic suppurative otitis media. If this were done it would probably be found that more than one in every hundred showed complete loss of hearing in one ear (noise apparatus in the sound ear), with or without loss of the vestibular reaction. It might also be found that the cochlear apparatus was more often affected than the vestibular apparatus.

Even if a little hearing remained, it would be impossible to be quite certain that there had not been a localised labyrinthitis limited to the lower part of the basal coil of the cochlea at one time. Such cases have been recorded on microscopic examination.

The writer has shown microscopic specimens of a case in which the cochlea was completely obliterated by formation of new bone. The vestibule, however, only showed slight formation of new connective tissue and a little new bone, while the canals were almost normal.

Whitehead (*Journal of Laryngology*, etc., 1904) had 27 cases of labyrinthitis in 691 cases of suppurative otitis media (four per cent.). Sixteen cases were cured. In only one case (a child of three months) did the labyrinthitis follow acute suppurative otitis media.

Scheibe (*Centralbl. f. Ohrenheilk.*, 1906, p. 493) records 16 cases of labyrinthitis in private practice in sixteen years. Five of these were due to acute middle ear suppuration (1 scarlatina, 1 diphtheria, and 3 diabetes). Five of the cases were due to chronic suppuration and six to tuberculosis. Only one of the patients died.

Nnrenberg (*Archiv. f. Ohrenheilk.*, Bd. lxxvi, p. 139) records 26 cases of labyrinthitis. Only two were due to acute or subacute otitis media. In one of these cases mastoiditis and facial paralysis were present, along with giddiness, tinnitus and loss of balancing. No operation was performed, and the patient recovered with only partial loss of the cochlear function and a normal caloric reaction on the affected side.

Ruttin (*Monatschr. f. Ohrenheilk.*, year 44, Heft. 4) records a hundred cases of labyrinth suppuration. In 65 the labyrinth operation was performed, and in the rest only the radical mastoid operation. The mortality of the labyrinth operation was only 1.5 per cent. The labyrinth operation was *not* performed in any case in which one or more of the labyrinth functions were retained. If, however, after the radical mastoid operation it was found that there was complete loss of labyrinth function, Neumann's operation was performed.

VIII. *Routes of Infection from the Labyrinth to the Meninges.*

Uchermann (*Zeitschr. f. Ohrenheilk.*, Bd. lxiv, p. 49) gives the following list: (1) Aqueduct of the cochlea. (2) Perineural sheath of cochlear and vestibular nerves. (3) Fistula of posterior or superior canal bursting inwards to the meninges. (4) Peri-vascular lymph spaces around the internal auditory artery and its branches. (5) Aqueduct of vestibule and saccus endolymphaticus; the latter is connected with the subdural lymph space by fine channels. (6) Venous infection along the veins accompanying the aqueducts of the cochlea and vestibule. (7) By way of the fossa subarcuata. Nos. 1 and 2 are by far the most common routes of infection. Purulent meningitis is the commonest intra-cranial complication in cases of labyrinth suppuration.

Meyer (*Centralbl. f. Ohrenheilk.*, 1910, p. 320) states that Weber-Liel, Key and Retzius have injected the aqueduct of the cochlea and the scala tympani with Berlin blue by injecting the subarachnoid space. Meyer records the case of a child, aged six months, which died of purulent meningitis following purulent rhinitis. Microscopic examination of the ear showed no pathological change in the windows or labyrinth capsule; hæmorrhages and curdled lymph were present in the vestibule and canals and fibrinous exudate with cocci in the aqueduct of the cochlea and adjacent part of the scala tympani. Although there was fibrinous exudate, pus and cocci in the internal meatus, no cocci were to be seen in the perineural or perivascular spaces of the modiolus. In this case the labyrinth had evidently become infected from the subarachnoid space along the aqueduct of the cochlea.

Blau (*Centralbl. f. Ohrenheilk.*, 1912, p. 391) has experimented on cats. He injected a pure culture of the streptococcus of erysipelas or *Streptococcus mucosus* through the membrane of the round window. The cocci were recovered from the lumbar fluid—in some cases in three hours. Microscopic examination showed changes sometimes confined to the scala tympani of the basal coil and cochlear aqueduct. Occasionally the whole cochlea and even the vestibule were affected. Two cats died of meningitis, and in these there were inflammatory changes in the cochlea of the non-operated side.

THE RHINOGENIC AND OTOGENIC LESIONS OF THE THIRD, FOURTH, FIFTH AND SIXTH CRANIAL NERVES.¹

By LADISLAUS ONODI (Budapest).

Translated by DAN McKENZIE.

IN an article in the *Arch. f. Laryngologie* I gave a description based upon my anatomical studies of the relations of the sphenoidal sinus to the nerve-trunks of the third, fourth, fifth, and sixth cranial nerves.

The results of these researches, as they are of considerable importance, in that they are the anatomical basis of the ætiology of the rhinogenic lesions of the ocular nerves, I here repeat.

(1) The thin translucent bony wall of the sphenoidal sinus was in direct contact with the trunk of the oculo-motor nerve for a distance of 12 mm. (2) The same wall was in direct contact for a short distance with the trunk of the trochlear nerve. (3) The same wall was in direct contact with the trunk of the first division of the trigeminal for a distance of 7, 10 (twice), 11, 12 and 22 mm.; with the trunk of the second division of the trigeminal for a distance of 6, 10 (twice), 13, 17, and 20 mm. In one case 2 cm. of this nerve could be seen projecting into the sinus. (4) The same wall was in direct contact with the trunk of the sixth nerve for a distance of 7, 10, 11, 12, 13 and 20 mm. (5) In one case the wall of the sinus of the right side was in direct contact with the trunks of the oculo-motor, the trochlear, the first division of the fifth and the sixth of the opposite, the left side. (6) In the remaining cases the sphenoidal sinus did not enter into relationship at all with the trunks of these four nerves. (7) The thin bony wall of the sphenoidal sinus was in direct contact with the clivus (dorsum sellæ) for 10 (twice) and 14 mm. in length, and 8, 10, 17 and 18 mm. in breadth. Otherwise the sphenoidal sinus was separated from the clivus (dorsum sellæ) by bone 6, 12 (twice), 16 (three times) mm. in thickness. In our article we noted that in the text-books only isolated accounts are given and only the general remark is made that the nerve-trunks which enter the orbit by the orbital fissure together with the second division of the trigeminal passing through the foramen rotundum may be sympathetically

¹ Paper read and preparations shown at the Annual Meeting of the Belgian Society of Otology, Rhinology and Laryngology. Brussels, July, 1913.

affected in sinus disease when the posterior ethmoidal cells have an abnormal transverse extension. In our article we also touched upon the well-known relationship of the ocular nerves to the cavernous sinus and internal carotid.

There still remains to be mentioned the relationships which subsist between the petrous bone and the nerves to the eye.

A direct relationship between the nerves of the eye and the temporal or rather the petrous bone containing the organ of hearing exists only with regard to the Gasserian ganglion of the trigeminus seeing that a part of Meckel's cave, in which the Gasserian ganglion lies—the trigeminal impression, is formed by the superior and anterior surface of the petrous bone in the vicinity of the apex of that bone. The Gasserian ganglion and the three divisions of the fifth nerve are confined by two folds of split dura mater—the deep fold forming at the same time the periosteum of the trigeminal impression on the petrous bone. The dura mater forming the periosteum of the petrous bone in the middle and posterior cranial fossæ is closely connected both with the tentorium cerebelli and with the dura of the cavernous sinus and the dorsum sellæ, thus the extension of pathological processes by continuity is possible from the petrous bone to the nerve-trunks entering the cavernous sinus. The oculo-motor penetrates the dura lateral to the posterior clinoid process; the fourth cranial nerve passes into the dura at the anterior end of the line of attachment of the tentorium, behind the oculo-motor; the trigeminal nerve enters by a fissure in the dura at the apex of the petrous bone into the cave of Meckel; the abducens pierces the dura at the posterior wall of the cavernous sinus medial to the trigeminus, and postero-laterally to the dorsum sellæ. As is well known, there is an intimate relationship between the cavernous sinus and the oculo-motor, the trochlear, the abducens, and the first and second divisions of the fifth nerve. The cavernous sinus is on both sides united with the circular sinus. Further, there is a direct connection with the orbital veins, with the superior and inferior petrosal sinuses at the petrous bone, and lastly, with direct emissary veins from the mucous lining of the sphenoidal sinus. In close relationship with the petrous bone is the internal carotid, which is enclosed by the cavernous sinus from the internal opening of the carotic canal at the apex of the petrous bone to the lateral wall of the sphenoidal sinus.

With regard to the etiology of rhinogenic and otogenic lesions of the oculo-orbital nerves, the first consideration is the infection and the extension of the pathological process. The route of infection

and the infective agents, especially streptococci and staphylococci, are shown in the continuity of the tissues and through the vessels. In this way associated disease of the osseous walls and direct contact-infection of the intra-cranial contents may develop. In addition to the blood-spaces of the cranial cavity and the venous anastomoses, a part is also played by the lymphatic vessels in direct and indirect infection of the intra-cranial contents. In the production of direct contact-infection of the intra-cranial contents there have to be considered, extension from the posterior ethmoidal cells to the middle cranial fossa, and extension from the sphenoidal sinns to the middle and posterior cranial fossæ, together with the strength and thickness of their bony walls, the bony dehiscences, and the communicating veins which unite the mucous lining of the nasal sinuses with the venous plexuses of the dura and meninges. With the direct rhinogenic lesions of the oculo-orbital nerves the posterior ethmoidal cells occasionally, and the sphenoidal cells more frequently, come into causal relationship. In the region of the orbital fissure and of the foramen rotundum the posterior ethmoidal cells, and also the sphenoidal sinns can come into close relationship with the trunks of the oculo-motor, the trochlear, the abducens and the first and second divisions of the trigeminus. The limiting bony walls of these sinuses may be extremely thin, even to the point of translucency. In the examples observed by us and mentioned above, the trunks of the oculo-orbital nerves were separated from the sphenoidal sinus by a translucent bony wall as thin as paper. In contrast with these morphological conditions which favour the extension of disease-processes from the sinuses, stand those which hinder extension to the oculo-orbital nerve trunks, namely, first of all, the bony walls of the sinuses when they are strong and thick, and secondly, the sinuses themselves when they are so small as not to impinge upon the region of the nerves.

Bony dehiscences of the sphenoidal sinuses must be regarded as highly favourable factors in the production of lesions of the oculo-orbital nerves. Congenital dehiscences of this kind have been reported by Zuckerkandl, Spee and A. Onodi. Zuckerkandl (2) saw in the lateral wall of the sphenoidal sinus small holes or dehiscences which connected the sphenoidal sinus with the middle cranial fossa. Spee (3) found a defect in the carotid groove in the lateral wall of the same sinus, and A. Onodi (4) observed foramina for vessels, often bilaterally symmetrical, under the lateral root of the lesser wing of the sphenoid—besides furrows

for vessels passing into these foramina and often with smaller or larger defects. In diseases of the auditory organ in the temporal bone, the dura mater in the middle and posterior cranial fossæ and the blood spaces come into consideration in the extension of the disease-processes, since the oculo-orbital nerves stand in relationship only with the apex of the petrous pyramid, while the Gasserian ganglion in the trigeminal impression is in direct contact with the anterior surface of that bone.

Direct and indirect infection may affect the oculo-orbital nerve-trunks just as it may induce inflammation of the meninges, of the venous sinuses and of the brain-tissue. We will describe the rhinogenic and the otogenic lesions of the oculo-orbital nerves separately, now that we have concluded these general remarks upon the etiology.

The number of cases of rhinogenic and otogenic lesions of the oculo-orbital nerves which have been published is somewhat small. Krebs (5) observed a secondary paralysis of the trochlear nerve in empyema of the antrum, and Thomson (6), a case of total oculo-motor paralysis in empyema of the ethmoidal cells. In disease of the posterior sinuses Birch-Hirschfeld (7) and Grönbeck (8) saw an affection of the oculo-orbital nerves which traverse the superior orbital fissure (p. 4). Rouge (16) observed in empyema of the sphenoidal sinus external strabismus and Thierloix and Dupasquier (16), diplopia. In sphenoidal sinus suppuration Schröder (9), Hoffmann (10), Lapersonne (11), Halász (12), and Schmiegelow (13), observed complete oculo-motor paralysis, and Baumgarten (14), oculo-motor paresis. Sargnon (16), observed in empyema of the ethmoidal cells and of the sphenoidal sinus total paralysis of the oculo-motor and in frontal sinus empyema and paresis of the oculo-motor. Ziem (17) observed paralysis of the oculo-motor in suppuration of the frontal sinus, ethmoidal cells and sphenoidal sinus. Malcolm Farquharson (16) observed paresis of the oculo-motor in suppuration of the ethmoidal cells and sphenoidal sinus, and A. Knapp the same paresis in suppuration of the ethmoidal cells. In empyema of the sphenoidal sinus Panas (15), Mahu (16), Richter (17), Grünwald (18), and Finlag (19), observed paralysis of the abducens, and Fisch (16) paresis of the abducens. In sphenoidal sinus suppuration Panas (21), observed anæsthesia of the second division of the trigeminus, Rouge (22) infra-orbital neuralgia, Schäfer (23), Moreau (24), Hajek (25), and Schröder (26), supra-orbital neuralgia. Trantas (27) observed complete ophthalmoplegia in

ethmoidal and sphenoidal suppuration, which had begun in the maxillary antrum. In irritation of the trigeminus we may perceive hyperæmia of the nasal mucous membrane, a smarter conjunctival reaction, ciliary neuralgia, and affection of the secretory nerves of the eye. Difficulty and sluggishness of accommodation, and ophthalmoplegia interna have been referred also to a lesion of the oculo-motor—of those fibres, namely, which pass through the ciliary ganglion to the sphincter pupillæ and to the tensor chorioideæ. That in the cases mentioned a causal connexion exists between the lesions of the nerves to the eye and the disease in the accessory sinuses is proved both clinically and pathologically.

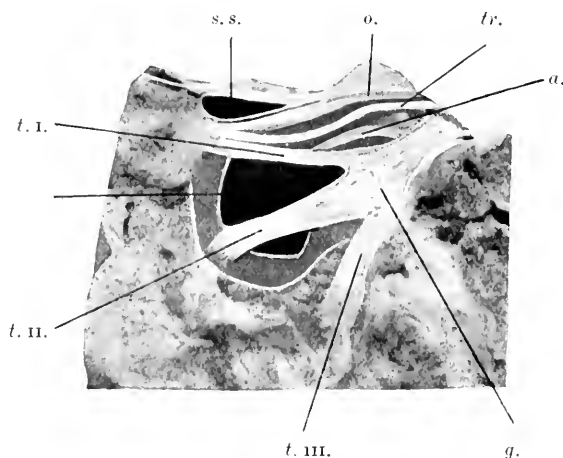


FIG. 1.—Natural size. The thin translucent bony wall of the sphenoidal sinus has been removed. *s. s.* Sphenoidal sinus. *g.* Gasserian ganglion. *t. iii.* Third division of the trigeminus. *t. ii.* Second division of the trigeminus. *t. i.* First division of the trigeminus. *a.* Abducens. *tr.* Trochlearis. *o.* Oculo-motor nerve.

In purulent inflammation and ulceration of the mucous membrane of the accessory sinuses and in thrombosis of the veins of the mucous membrane of the accessory sinuses, the inflammatory process, when the bony walls are extremely thin, is apt to extend through the bone to the dura mater and to the trunks of the nerves to the eye in direct contact with the bone and with the dura, as well as to the vascular sinuses of the cranium. In this way hyperæmia and inflammation of the nerve-trunks can develop; collections of serum or pus and thrombo-phlebitis of the venous sinuses may exercise direct pressure upon the nerve-trunks, and lastly, destruction of the oculo-orbital nerves. In our investigations we have in several cases found the trunks of the

oculo-orbital nerves in direct contact with a thin translucent osseous wall of the sphenoidal sinus; to wit, the oculo-motor for a distance of 12 mm.: the first division of the trigeminus for from 7 to 20 mm.; the second division of the trigeminus for from 6 to 20 mm.; the abducens for from 7 to 20 mm. From the work of ours which has already been mentioned (28), we borrow some illustrations of preparations which show the intimate relationship of the oculo-orbital nerves to the sphenoidal sinus. In Fig. 1, the 30 mm. long, 26 mm. high, and 25 mm. broad sphenoidal sinus (*s. s.*) is in direct contact with the second branch of the trigeminus (*t. II*) for a distance of 15 mm., and with the border of the first

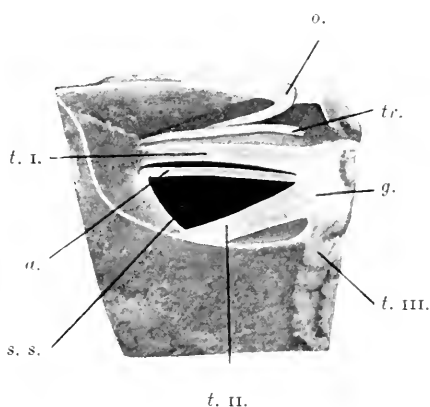


FIG. 2.—Natural size. The thin translucent wall of the sphenoidal sinus has been removed. *g.* Gasserian ganglion. *t. III.* Third division of the trigeminus. *t. II.* Second division of the trigeminus. *t. I.* First division of the trigeminus. *a.* Abducens. *tr.* Trochlearis. *o.* Oculo-motor nerve. *s. s.* Sphenoidal sinus.

branch of the trigeminus (*t. I*). The sphenoidal sinus extends under the foramen opticum and laterally to the superior orbital fissure and is directly in contact in this way with the trunk of the oculo-motor for a distance of 12 mm.

In Fig. 2 the 22 mm. broad and 26 mm. high sphenoidal sinus is in contact for a distance of 17 mm. with the second division of the trigeminus (*t. II*), and for a length of 20 mm. the first division of the trigeminus (*t. I*) and the abducens (*a.*).

Fig. 3 shows the 30 mm. high and 37 mm. long sphenoidal sinus (*s. s.*) in a length of 2 cm. the prominent bony wall in contact with the trunk of the second division of the trigeminal (*t. II*). After removing the thin bony wall the course of the trunk of the second division of the trigeminal can be seen.

The findings of our researches and these pictures give the anatomical explanation of the development of rhinogenic lesions of the oculo-orbital nerves. They explain the paralyses and pareses of the oculo-motor, the paralyses and pareses of the abducens, the anaesthesia of the fifth nerve, and the infra-orbital and supra-orbital neuralgia which have been observed in accessory sinus disease.

A preparation, which we copy from our work already mentioned (see Fig. 4), shows a great asymmetry of the sphenoidal sinus. The right sphenoidal sinus is 30 mm. broad and 28 mm. long, while the left sphenoidal sinus appears as a small cavity, 10 mm. in height

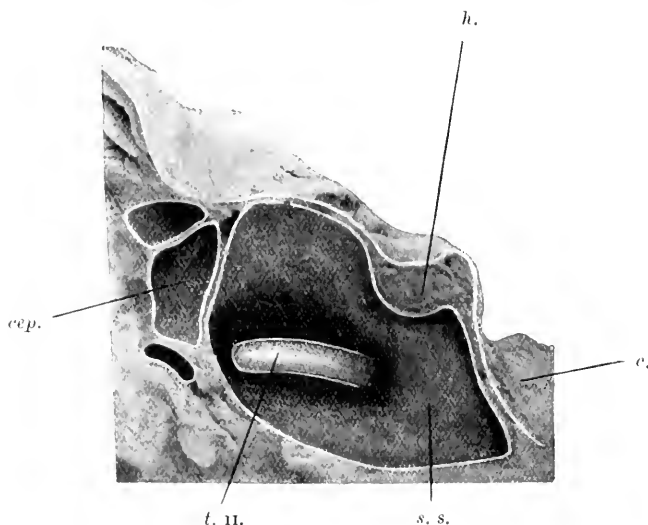


FIG. 3.—Natural size. Sagittal section. The sphenoidal sinus is opened and the prominent, thin bony wall of the sphenoidal sinus in the course of the second division of the trigeminus has been removed. *s. s.* Sphenoidal sinus. *t. 11.* Second division of the trigeminus. *c.* Clivus. *h.* Hypophysis. *cep.* Posterior ethmoidal cells.

and 12 mm. in breadth, in the neighbourhood of the left optic nerve. The right sphenoidal sinus (*s. s. d.*) extends to the left side and comes into contact with the trunks of the left abducens (*a. s.*) the left trochlearis (*t. r. s.*), the left oculo-motor (*o. s.*) and the first division of the left trigeminal (*t. 1*), together with, for a small distance, the first division of the right trigeminal and the right abducens.

This fact, observed by us, gives the anatomical explanation of the production of a contra-lateral lesion of the oculo-orbital nerves in disease of a sphenoidal sinus of the opposite side. Our know-

ledge of the rhinogenic, contra-lateral lesions of the nerves of the eye has thus been enlarged by a new aetiological factor.

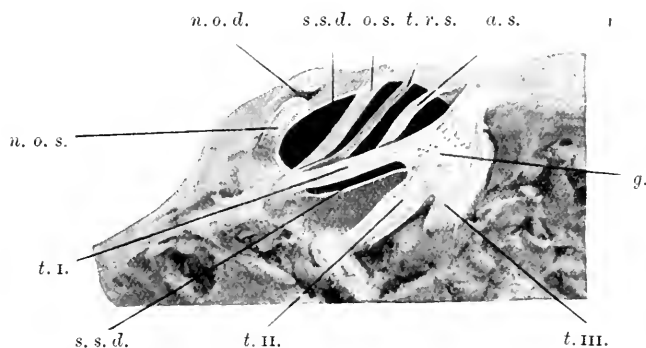


FIG. 4.—Natural size. The thin transparent bony wall of the right sphenoidal sinus has been removed. *g.* Gasserian ganglion. *t. III.* Third division of the trigeminal. *t. II.* Second division of the trigeminal. *t. I.* First division of the trigeminal. *n. o. s.* Left optic nerve. *n. o. d.* Right optic nerve. *o. s.* Left oculo-motor. *t. r. s.* Left trochlears. *a. s.* Left abducens. *s. s. d.* Right sphenoidal sinus.

Fig. 5 shows the relationship of the left sphenoidal sinus to the trunk of the abducens. The sphenoidal sinus is in contact with

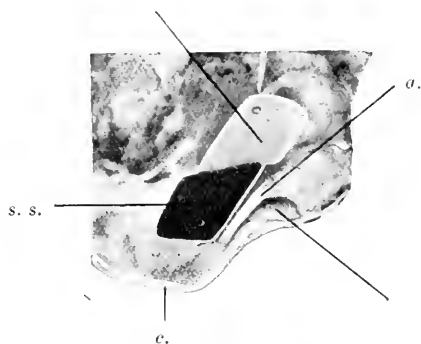


FIG. 5.—Natural size. Relation of the sphenoidal sinus to the abducens and the clivus.

the region of the clivus for a length of 17 mm. and a breadth of 14 mm. Further it enters into direct relationship with the trunk of the abducens from the point where it enters the dura.

(To be continued).

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

February 20, 1914.

MR. RICHARD LAKE, *President, in the Chair.*

Abscess of Lateral Cerebellar Lobe; Recovery after Repeated Operations.—C. E. West.—Female, aged five. Old history of chronic discharge on both sides, with cessation for some time, and recent renewal of discharge on right side. Ill for a week, with headache, vomiting, and increasing drowsiness. On admission, July 5, 1912, patient was semi-conscious, with a coated tongue. There was discharge in the right ear. No squint, no neck-stiffness, reflexes normal, no Kernig or Babinski sign. Pulse irregular, 68; temperature, 97°–98° F.; respirations, 20 per minute. Slight lateral nystagmus on deviation of the eyes to the right. Operation (immediate): Radical mastoid, cholesteatoma; exposure of dura mater of posterior fossa, extradural suppuration. Sinus found leading through dura on inner side of lateral sinus to interior of cerebellum. Two drachms of foul pus evacuated. Tube drainage. Pus from abscess yielded pure streptococci. Lumbar puncture: Fluid sterile, 650 cells per cubic millimetre, 93 per cent. lymphocytes. Patient did well till July 13, when pulse fell to 62. Second operation: Exploration under anæsthetic—evacuation of about a drachm of pus. Improvement followed; then re-accumulation. Third operation (July 25): Removal of bone on outer side of sinus, and drainage of fresh collection in cerebellum; tube carried right through deep to sinus. Next day much worse, intense headache, pulse 60, respirations slow and irregular, less than 10 per minute. Fourth operation (July 26): Wide removal of tabular part of occipital bone and underlying dura mater. The exposed cerebellum was then boldly scooped out until the region of the abscess was widely exposed. The removed tissue was largely necrotic, and contained scattered small collections of pus. About half the lateral lobe of the cerebellum was removed in this way. Intravenous infusion at the end of the operation. Subsequent improvement, but a considerable hernia cerebelli developed. There was great wasting and weakness of the right limbs. At first there was a total loss of co-ordination in the right limbs, but this was gradually recovered. Fifth operation (September 18): Large flap of scalp and periosteum was slung downwards to cover the hernia, and the bared bone was grafted. There was intense shock. Recovery after pituitrin and intravenous saline. Slow healing of exposed bone after separation of several thin sequestra. For the past twelve months her health has been satisfactory. The hernia has slowly diminished in size and become firmer.

Mr. WEST wished the opinions of members as to the best way of draining brain abscess, particularly cerebellar abscess, because he failed to secure good drainage in many cases. The cerebro-spinal lymphocytosis was interesting; 93 per cent. of lymphocytes in the cerebro-spinal fluid in the brain abscess was unusual. In such cases the great proportion of cells were polymorphonuclear leucocytes. In this case lumbar puncture was made at the operation after the abscess was opened. He once

showed a case at the Section in which a similar operation had been done on a temporo-sphenoidal abscess, and he thought the procedure of boldly opening up not only the cranium, but the brain also, so as to expose the deep infected area in desperate cases, was a justifiable and good course. Although deprived of a considerable quantity of brain-tissue such cases did not suffer much obvious disadvantage. The present child had now got less than one third of the right lateral lobe of the cerebellum, and most of that was underneath the flap.

Dr. H. J. DAVIS had not yet made up his mind as to the best way to drain brain abscess; the indication seemed to vary with each case. He was not decided either as to whether always to remove the dura mater over the abscess after it had been opened. If the dura mater were stripped over the entire area he thought the patient was more likely to die from meningitis. He had a case now which he had been treating for the last ten days, and he was certain the girl would not have lived if he had denuded the whole area of exposed brain. Hæmorrhage and necrosis were always liable to occur, if this was done, with subsequent sloughing. Three years ago he had exhibited a case¹ of a child who had much protruding brain-substance, and who used to put her hand under the bandage into the wound and pull out pieces of brain-tissue and put them into her mouth. She now was going about with a pulsating cranial tumour, and was aged fifteen, rather bad tempered but otherwise well. He was sure the proper material for drainage was gauze, or tubes covered with gauze, in which case it was the gauze which was efficacious. Tubes became blocked with *débris* and were no longer tubes.

Mr. MUECKE said that at the London Hospital in every case in which they had left the drains inside the lateral sinus it had not been satisfactory. The bone was taken away from behind the sinus and the abscess tackled from behind with a very free wide opening. The tube had been found to be a great trouble. One of the most satisfactory things adopted lately, at the suggestion of Mr. Tod, was the use of an ordinary silver tracheotomy tube tied firmly in, the inner tube being removed for cleaning. The result had been excellent.

Mr. WESTMACOTT said that in children with cerebellar abscess the best results were obtained by putting in a double rubber tube, one inside the other, or two tubes side by side, and leaving them in until the discharge ceased, without disturbing them at all. The inner tube could be removed or cleared out with a probe without disturbing the outer one. Sometimes when a single tube was taken out to clean it and then replaced the patient soon afterwards developed a temperature and died. It was difficult to get a tube back into the abscess properly, and fresh brain-tissue may be damaged in the attempt and encephalitis result.

Mr. SYDNEY SCOTT said one was struck by the frequency with which the lateral sinus was thrombosed, not necessarily with an infective thrombosis, but certainly by a plastic one. He asked whether this lateral sinus was thrombosed. He was coming to the conclusion that in a case of cerebellar abscess which was not doing well, it was right to open the cerebellar fossa, behind as well as mesial to the lateral sinus, and one could often cut right across the sinus without difficulty when the vessel was thrombosed. The cases to which Mr. Scott referred were not associated with the clinical signs usually met with in infective thrombosis.

Mr. WEST replied that the sinus was not thrombosed, but ultimately it was included in the area of the dura mater removed. He was interested in the suggestion to use a tracheotomy tube or a straight tube with a jacket.

¹ "Discussion on Cerebral Abscess," *Proceedings, Otol. Section.*

He was not bringing this case forward to illustrate a routine method of treating cerebellar abscess. But in this case he had done everything he knew; he had opened it in front, and behind, and across the sinus, and the patient was at death's door because of the burrowing suppuration in the cerebellum. Under such circumstances only he thought it was wise to do what he had; he would not in the ordinary way disturb the adhesion of the dura mater to the brain. In such desperate cases it was only when one exposed deeply the infected area that one had a chance.

Herpes Zoster of the Auricle and Mastoid Region.—H. J. Davis.—

A woman, aged twenty-six, was sent to him as a case of acute mastoid disease. There was some œdema and tenderness behind the left ear, accompanied by a papular and vesicular eruption on the back of the auricle, mastoid process and left cheek. This eruption had been preceded by great pain, which ceased, as is usually the case, on the appearance of the eruption. Dr. Pernet, to whom he referred the case, had agreed with the diagnosis. Herpes zoster of the auricle is an extremely rare condition.

Dr. URBAN PRITCHARD did not think it was always easy to diagnose a case of herpes zoster. A patient, whom he had spoken of before, was brought to him with all the signs, apparently, of acute mastoid disease, with complete facial paralysis, but hearing normal. On examining the membrane it was found to be bulging. There was no temperature. There was excessive pain, but no spots of herpes were visible at all. As the patient was hearing perfectly he said he would not open it, and he asked that he might see the patient again in a few days. The diagnosis was then easy, because in the concha there were three spots. He gave a good prognosis, and in four months the patient had quite recovered from the facial paralysis.

Mr. WHALE pointed out that if there was herpes of the internal meatus the geniculate ganglion might be at fault, because the impulse would go along the smaller superficial nerve and the auriculo-temporal. In Dr. Davis's case there was no herpes of the meatus or in front of the ear. There was herpes behind the ear, and that area was supplied by Jacobson's nerve; the connection between Jacobson's nerve and the facial occurred at the horizontal part of the facial, and therefore the seat of irritation must be behind the anterior genu and in front of the geniculate ganglion.

Mr. SYDNEY SCOTT remembered a case of herpes of the auricle associated with complete right side facial paralysis, deafness, and loss of function of the right vestibular nerve. The tympanic membranes, external meatus and Eustachian tubes were normal. He could not give a good prognosis in his case.

Mr. G. J. JENKINS understood this was not a case of geniculate herpes, but probably of herpes of the auricle. The posterior division of the great auricular supplied the external and the cranial aspect of the pinna. He asked if there was referred pain along the great occipital, which came from the same region in the spinal cord.

Dr. H. J. DAVIS replied that he thought it was a branch of the cervical plexus which was at fault. One could now see vesicles on the neck. They were not on the neck when he first saw the case, but they appeared there on the second day. The woman had had intense pain for a week, and it looked like a mastoid case; there was also considerable œdema over the mastoid process and over the posterior part of the concha. He saw nothing inside the ear. He thought it was herpes of the great auricular nerve. He did not regard it as a geniculate case; if it were so there would have been facial paralysis as well.

Congenital Imperforate Meatus.—H. J. Davis.—A boy, aged fifteen, with an imperforate right meatus. The right ear was smaller than the left, and the meatus terminated blindly in a small dimple. He thought that the membrane must be present, and it was a question as to whether it would not be advisable to operate in this case. Hearing tests: Watch on contact and Weber right. The hearing in the left ear was normal.

Dr. KELSON had had cases and looked up the literature of the subject, which was discouraging; Mr. Tod collected a number of records, and there was, he thought, only one in which there was improvement. It was wiser not to operate, as the usual landmarks were absent, and the articulation of the jaw and other important structures were liable to be damaged.

Microscopical Section through a Right Temporal Bone from a Case of Lateral Sinus Thrombosis, to show Infection spreading through a Small Vessel in the Bone.—W. M. Mollison.—This vessel could be seen passing from the floor (?) of the antrum to the lateral sinus. The patient was a child, aged about nine, who had an acute mastoiditis, for which a surgeon performed Wilde's incision; at the time of the operation the patient had a high temperature, and five days later died with typical symptoms of generalised infection. *Post-mortem*, extensive thrombosis was present, and secondary infection of the lungs, in which abscesses were found.

Mr. JENKINS asked whether Mr. Mollison considered the thrombosis in the vein to be primary or secondary.

Mr. WEST said the case supported his view that lateral sinus thrombosis was almost always in the first place an intra-osseous thrombosis, and that infection rarely passed directly through the substance of the sinus wall. Sinus thrombosis with peri-sinus abscess was frequent, but in his experience always relatively late, and the sinus wall had been necrotic in every case he had seen. He believed these abscesses were secondary to the thrombosis and necrosis of the wall.

Mr. MOLLISON replied that it was not clear whether the section helped to prove Mr. West's point, but he had seen cases where he was convinced at operation that the infection had spread by means of a small vein through the bone, and not by direct extension. Beyond the region of obvious disease in some cases there was perhaps $\frac{1}{4}$ or $\frac{1}{2}$ in. of healthy bone, and then one came across pus next to the sinus wall. He could not say whether the clotting was primary or secondary. Two pathologists who saw the section thought the thrombosis had been there longer than the history of the case as related.

Left-sided Cerebello-pontine Lesion, probably Tumour.—W. M. Mollison.—Male, aged sixteen, attended hospital in May, 1913, on account of a left-sided facial paralysis. There was a suspicion that the paralysis was due to suppurative in the middle ear; the mastoid antrum was explored but found healthy. The patient was treated in the electrical department, as the case was taken to be one of Bell's palsy. In December last the patient was admitted for further investigation, and the conclusion was come to that there were evidences of a tumour of the left cerebello-pontine angle. There was paralysis of the seventh and eighth nerves on the left side, together with signs of pressure on the pyramidal fibres going to the right leg. A slight degree of nystagmus was also present. Vision defective, especially in the left eye. The gradual onset and the physical

signs pointed to a tumour in the cerebello-pontine angle of the left side. Eyes: Vision in the right $\frac{6}{9}$, in the left, $\frac{6}{24}$; the left pupil reacted very feebly to light and there was papilloedema on both sides, more marked on the left; there was slight weakness of the left external rectus. The left globe was slightly dropped, due probably to involvement of the corpora quadrigemina. Examination of the ears: both membranes normal. With the "noise-apparatus" there was total deafness in the left ear; the right was normal. Nystagmus present; the patient had no vertigo, nor had he ever had any. He had some headache about a year ago but had none now. Gait ataxic and he could not stand on one foot with closed eyes, though he did not exhibit Romberg's sign; dysidiado-kokinesis was present in slight degree. The nystagmus is horizontal and of a slow, coarse character when the patient looks to the left, about 80 per minute and very irregular, and quick and fine when the eyes are directed to the right, about 180 per minute. There was a spontaneous pointing error to the right with the left arm. Functional examination of the labyrinth: Caloric test.—After prolonged syringing of the right ear with ice-cooled water no alteration was produced in the spontaneous nystagmus, and there was no error in the pointing reaction. The same result was obtained after syringing the left ear. The only effect of syringing the right (the sound side) was that the patient had a tendency to fall to the right. Rotation.—The right labyrinth reacts, the left does not. This fact was elicited, not by observing nystagmus, as this is impossible, but by noting that the patient had a distinct tendency to fall (to the right?) after turning in a counter-clockwise direction, and by noting the resulting errors in the pointing tests. After ten counter-clockwise turns (to the left) there was with the *right* arm a pointing error to the left, while the spontaneous error with the *left* arm tended to disappear. After ten clockwise turns there was no appreciable pointing error with the *right* arm and no change in the spontaneous error with the *left*; but after twenty turns there was a slight error to the right with the *right* arm, and distinct increase in the spontaneous error with the *left*. The results of these tests are compatible with a left-sided cerebellar lesion.

Mr. SYDNEY SCOTT asked Mr. Mollison whether the tongue was affected for taste. With regard to the functional examination of the labyrinth Mr. Mollison said, "after prolonged syringing of the right ear with ice-cooled water, no alteration was produced in the spontaneous nystagmus, and there was no error in the pointing reaction." He presumed the head was in the erect posture in that test. But of course it depended on the kind of pointing test; he would not expect an error in pointing when the caloric test was carried out with ice-cooled water with the head erect, unless one altered the position of the head and tested both hands. He asked what Mr. Mollison found if he turned the patient's head with chin towards the left, and the patient was directed to point at right angles to the side of the head. He could then emphasise the importance of ascertaining whether the right labyrinth functionated or not, not by the nystagmus, but by these forced movements of the head, trunk, and limbs, which were more easily observed, also by the effect on gait and on standing in the erect posture during the act of stimulation.

Mr. O'MALLEY asked Mr. Mollison what was the condition of the corneal reflex; was there a hypo-aesthetic condition of the face, suggesting involvement of the fifth?

Mr. MOLLISON replied that there was loss of taste in front of the tongue on that side, but no wasting and no suggestion of involvement of that nerve. The fifth nerve, apparently, was not affected at all. He

gathered that the slight difference in sensation in the face was due to involvement of the facial only. The case emphasised the importance of testing the hearing in all cases of facial paralysis.

Serial Microscopic Sections of the Labyrinth and Middle Ear, showing Ankylosis of the Stapes; Otosclerosis.—G. J. Jenkins.—The patient was a female, aged sixty-seven. The mental condition of the patient was not good, and so a complete satisfactory examination of the auditory apparatus was not possible. She had been deaf many years. There was no history of earache or discharge; tinnitus, “waves of the sea.” Vertigo doubtful. The tympanic membrane did not show any sign of there having been any middle-ear inflammation at any time. Tuning-fork tests doubtful. Weber test: sound referred to right ear. Rinne test: bone-conduction greater than air-conduction. Bone-conduction (Edelmann’s special fork) seemed much diminished in both ears. She could hear shouting, a raised conversational voice in right ear; nothing in the left. Both temporal bones were removed about eight hours after death and placed in a 4 per cent. solution of formalin in normal saline. In preparing the specimen the exhibitor adopted the method of decalcifying which Dr. Gray advised, *i.e.* with formalin and nitric acid. He did not think he had found the temporal bones cut so easily when decalcified with other reagents as with this. Also histologically this method gives the best results. The serial sections were of the right temporal bone, and have been cut transversely to the large axis of the petrous bone. The bone was cut in celloidin 12.5 mm. in thickness, every third section being mounted. The sections were stained variously by Mallory stain, hæmatoxylin and Van Gieson, iron-hæmatoxylin. A series of sections of the labyrinth and middle ear had been shown under the microscope, and he demonstrated the region of the stapes by the epidiascope. The ankylosis of the stapes to the margin of the foramen, the thickening of the base of the stapes and of the margin of the foramen by disease were demonstrated.¹

Dr. URBAN PRITCHARD asked whether Mr. Jenkins had tried the plan of keeping the piece of bone constantly agitated in a large quantity of that solution.

The PRESIDENT (Mr. RICHARD LAKE) asked why it should be otosclerosis: he would have liked to know what the Wassermann reaction was. He had tried testing old people in infirmaries, and had to give it up as hopeless.

Mr. SYDNEY SCOTT asked whether Mr. Jenkins was ever troubled by gas-bubbles?

Mr. JENKINS replied that one made the diagnosis in this case largely on the microscopic evidence. Clinically he could not rely much on tests. There was no history of paracusis. The other joints of the middle ear were normal, and, as far as he could see, there was nothing else abnormal to be seen in the temporal bone. He did not carry out agitation of the fluid in the way mentioned by Dr. Pritchard. If the specimen was very important it was wise to keep it in the middle of the fluid and carry out agitation by means of a special apparatus. In decalcifying by this method one did not get air-bubbles in the labyrinth—at any rate as a serious feature. Air-bubble formation was not so obvious on the external surface of the temporal bone if the two elements of the fluid were left together for twenty-four hours before putting the specimen in.

¹ We hope to publish at an early date an article by Mr. Jenkins dealing with the histological pathology of otosclerosis.

Re-education Treatment: Improvement in Hearing in a Congenitally Deaf Boy.—**Richard Lake.**—The patient was born in June, 1905. He had his adenoids removed in September, 1907. The boy was a deaf-mute without available hearing. From 1909 to 1913 he was regularly instructed in lip-reading with very good results. I examined him March 10, 1913, and found one island of hearing in the left ear for the whistle (only)—viz. A⁴. He then began mechanical (re-educational) treatment, which has been employed with intervals of rest ever since. By the middle of April he heard a barrel-organ if quite close, as "a noise," and liked gramophones. By June, 1913, he heard vowel sounds shouted into the left ear; by August he could repeat nearly forty short sentences shouted into his left ear. Now he could recognise pitch in both ears, and he hears birds if close by. The teaching is, of course, equally of importance with the mechanical stimulation.

Deformities of External Ears.—**J. H. Connolly.**—Boy, aged eight. The right auditory meatus appears never to have been patent. The left meatus is represented by a narrow canal—not in the normal position—at the deepest part of which granulations can be seen. Discharge began to come from it about six months ago and has continued since. The child hears the voice in both ears; rather better on the left side than on the right. Electrical tests show that both labyrinth reactions are present. He asked if an attempt should be made to construct a meatus on the right side. The discharge and granulations in the left canal indicate operation for their relief, and at the same time the making, if possible, of a widely patent meatus on that side.

The PRESIDENT suggested that X rays might be used to see the situation of the meatus. He had not found such operations as that now suggested successful.

Dr. URBAN PRITCHARD said that he had not come across a single successful case of the kind.

Uncapping the External Semicircular Canal for Ménière's Symptoms; Complete Relief for Three Months.—**W. H. Kelson.**—Male, aged forty-three. Attacks began about three years ago with giddiness, buzzing noises and deafness in the right ear; after a time coldness and vomiting would come on. Duration of attack usually one to two hours. When giddy he felt himself falling backwards or forwards, or objects seemed to circle round him. He was never unconscious. Attacks became more frequent and work impossible. No giddiness between attacks. Sent to hospital on September 24. Examination showed, watch—right, $\frac{1}{30}$; left, $\frac{2}{30}$; C tuning-fork on vertex referred to right ear;—Rinne right, + Rinne left. Water at 22° C., right side nystagmus to left after sixty-nine seconds: water at 22° C., left side nystagmus to the right after thirty seconds. No Rombergism. Wassermann test negative. Operation (October 2, 1913). Outer wall of external semicircular canal (right) removed; escape of perilymph. For three months giddiness and tinnitus entirely disappeared, since when some very slight attacks.

The PRESIDENT said it was rare, in opening virgin labyrinths in which there was no suppuration, to find intra-labyrinthine fluid visible; he had only twice seen fluid in such labyrinths.

Mr. SYDNEY SCOTT thought that if he had a case like this he would feel disposed to open the middle ear at the first operation and observe whether it had any effect on the vertigo before he opened the semicircular canal, using the latter only as a last resort. One met with cases of Ménière's

symptom-complex, with obstructive deafness, and it was a question whether the disease had not originated in the middle ear, producing a secondary influence on the internal ear. He would like to know the results of opening the antrum only.

Dr. H. J. DAVIS said that if one was able to relieve the vertigo by so simple a remedy as opening a semicircular canal, the complete vestibulotomy would not be found necessary. The question was whether there would be a tendency for vertigo to return in Dr. Kelson's case.

Mr. JENKINS said the operation was similar to the one he advocated some time ago for certain labyrinthine vertigo cases. His own cases were definitely labyrinthine conditions, and there was no doubt as to there being no middle-ear condition. He asked whether in this case there was any real indication of labyrinth deafness. Still, there had been improvement in the vertigo after this operation in this case: the patient was quite certain about it.

Mr. MUECKE had seen a similar case in a boy, aged thirteen, following ordinary middle-ear suppuration. There was a constant vertigo, especially severe in winter. The boy was, in consequence, taken away from school. He had daily inflation for a fortnight, and the boy recovered and had not had another attack since, though that was three years ago.

Dr. KELSON replied that there was a little watery fluid. The fact that there was no improvement on inflation with the catheter showed that opening the antrum alone would not be likely to suffice; and even if it were so, it would have to be kept open permanently—a troublesome matter.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Meeting at the Royal Infirmary, Edinburgh, November 22, 1913.

MR. J. D. LITHGOW *in the Chair.*

Reported by DR. W. S. SYME.

(Continued from p. 215.)

Peculiar Hyperplasia of the Mucous Membrane of the Uvula Soft Palate, Pharynx and Larynx.¹—A. Logan Turner.

Dr. WALKER DOWNIE asked if, in the early stage, there had been any acute local inflammation. He had had a somewhat similar case in which the hyperplasia was preceded by a subacute inflammatory process associated with the formation of a fibrinous exudation, which persisted for many months. It was followed by marked contraction of the fauces, pharynx, and gullet.

Dr. BROWN KELLY said this case further confirmed the existence of a condition which he had described a good many years ago. Since then Sir Felix Semon and Dr. Logan Turner had published similar cases, so that the affection seemed to be a distinct one. His case differed somewhat from those shown by Dr. Logan Turner. The striking feature in it

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., February, 1914, p. 57 *et seq.*

was the size of the uvula, which was $1\frac{1}{2}$ in. long, 1 in. broad, and very thick. After a portion had been removed the posterior wall of the pharynx presented in the middle a narrow track of normal tissue, and on each side a thick band which extended from the naso-pharynx to the entrance of the œsophagus. These bands, together with some thickening of the soft palate, reduced the naso-pharynx so that one could hardly introduce the forefinger, although the patient was a man of 6 ft. 2 in. The bands overhung the larynx in such a way as to hide the ary-tænoids. Dr. McBride and Dr. Logan Turner examined the patient and agreed that they had seen nothing like it previously.

Dr. ADAM, in 1905, before the Glasgow Medico-Chirurgical Society, reported a case of chronic œdema of the face lasting for two years in a patient aged twenty-two. The condition began with crusts in the anterior nares. The œdema involved the left half of the face, soft palate, uvula and inferior turbinals. After uvulotomy and turbinotomy, with the administration of thyroid gland substance the condition cleared up. Leucocytic infiltration of the parts removed was reported. He had seen the patient a few days ago, and there was practically no trace of the thickening of the mucous membrane. That case clearly showed that it was of infective origin. In Dr. Turner's case the patient said she had symptoms of crusting about the pharynx some eighteen months before she consulted him; so that there, too, there was a possibility of infection. One of Sir Felix Semon's cases also cleared up.

Dr. LOGAN TURNER replied that the question of myxœdema arose; there was something about the patient's appearance which suggested it. She was put on thyroid for three months but no change resulted. Dr. Adam referred to septic infection. In his (Dr. Turner's) first case, seen some ten years ago, the symptoms came on after an acute infection, so much so that the patient required tracheotomy. He had seen that patient a few days ago and he still had some of the appearances which he had several years ago, although his uvula and soft palate had returned to their normal. He was on vaccine for some eighteen months, and he attributed the clearing up of the soft palate to the vaccine, but it had had no effect on the laryngeal condition.

Multiple Telangiectases of the Skin of the Face and the Mucous Membrane of the Nose and Mouth.—A. Logan Turner.—

Male, aged 59, a labourer, admitted on account of severe recurring epistaxis; attacks of nasal hæmorrhage during the last twenty years, becoming worse: the epistaxis is not so troublesome in the summer. No history of nose-bleeding in the family. No hæmophilic diathesis. No bleeding from mouth, bladder, or rectum. The telangiectases upon the face first appeared about forty years ago. They are not confined to the face, a few scattered points being seen over the scapulæ and on the skin of abdomen. At the anterior end of the nasal septum on each side there was visible clotting of blood and a slight superficial ulceration; the mucous membrane of the lips, inside of cheeks, tongue, and palate shows here and there minute vascular points and a little dilatation of capillaries. None of the points are raised above the surface. There are none visible in the larynx. The conjunctivæ are similarly affected.

Dr. BROWN KELLY asked if Dr. Turner was doing anything for the patient. Personally he had had two cases which he reported in 1906, one of them died of persistent hæmorrhage, and the other was in a state of chronic invalidism, and could not do anything on account of the bleeding from the telangiectases on the fingers. He had tried calcium

salts, and the patient always thought they were somewhat improved thereby. For the telangiectasés of the nose he did not think it was good to cauterise, but for specially large ones electrolysis with the needle as the positive pole was worth trying.

Dr. TURNER, in reply, said he had not thought of any treatment beyond the control of the epistaxis for which the patient was admitted. There was no heredity; this point was very carefully inquired into because in some of these cases there was a hereditary history.

Two Cases of Sarcoma of the Tonsil (shown at the meeting in November, 1912).¹—**A. Logan Turner.**—In each case the tumour was removed by enucleation twelve months ago, and there is no evidence of recurrence.

Malignant Disease of the Upper End of the Œsophagus (removed by œsophagectomy in November, 1910).²—**A. Logan Turner.**—Mrs. B——, now aged forty, continues to enjoy good health.

Dr. TURNER said he had another case which had been operated on, where the upper end of the œsophagus was affected. They had had at least four of these cases operated on; they were at present treating an inoperable case in hospital with radium. A pharyngostomy was performed. The improvement was marked. The whole of the pharyngeal part had ulcerated away; the œsophageal portion was still under treatment. With regard to the case shown it was three years since Mr. Wallace removed a complete circle of the œsophagus $1\frac{1}{2}$ inches in diameter. The patient was in excellent health, and she was swallowing by the natural route.

Symptoms similar to those observed with Paralysis of the Soft Palate following Removal of Tonsils and Adenoids.—**A. Logan Turner.**—E. L——, aged six, had her adenoids and tonsils (enucleation) removed two and a half years ago. Since that time liquids have occasionally returned through the nose, and in her speech there is evidence of insufficiency of the palate (rhinolalia aperta). Her mother asserts this dates from the operation, and that there was no evidence of these symptoms prior to that time. Has the operation interfered with the proper elevation of the soft palate? On digital examination of the nasopharynx the soft palate feels tense across the finger. Probably congenital submucous cleft palate may be excluded. The case had been seen recently and was recovering.

Dr. SYME had a case of a child about a year ago who was brought back three months after operation with a history of fluids coming back through the nose, nasal speech and so on. He had advised that she would get all right. He looked upon it as a septic neuritis, just as one gets a neuritis after diphtheria. He had not seen the child again, and concluded she had recovered.

Otitic Meningitis; Translabyrinthine Drainage; Urotropin Injections into Spinal Canal; Recovery.—**A. Logan Turner.**—Girl, aged seven, chronic middle-ear suppuration (left) for five years. Polypus projecting from meatus; frequent pain, but no internal ear symptoms or signs. No vestibular tests carried out. Radical operation on October 20, 1913. Polypus attached in region of the windows;

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 161.

² *Ibid.*, vol. xxvii, p. 157.

stapes not seen. No cholesteatoma. October 21 (noon): Temperature, 100.6° F.; pulse 120; frontal headache; nystagmus to both sides; marked to sound side. 6 p.m.: Temperature, 101°; slight neck rigidity; double Kernig; reflexes normal; leucocytosis, 7500. 8 p.m.: General anaesthesia; wound opened; cold caloric test for 2½ minutes; a few quick nystagmic movements induced to diseased side. Probe passed without opposition through oval window. *Lumbar puncture*.—Slight cloudiness of cerebrospinal fluid; faintly acid reaction; broad band of albumen; incomplete Fehling reduction. (Later, polymorphonuclear cells; Gram + diplococci; no growth on culture.) Double vestibulotomy, removal of promontory, and internal auditory meatus opened; free flow of cerebrospinal fluid; no drain inserted. No pus seen in labyrinth. The partial obliteration of external canal and lower cochlear whorl observed indicated old healed labyrinthitis. *After-history*.—Child very ill at times; temperature and pulse varied (charts exhibited). Cerebrospinal fluid would drain freely for two or three days, then stop and again flow. During cessation child always worse. Lumbar puncture and urotropin injections on October 23, 27 and 31, and November 1 and 6. Cerebrospinal fluid remained under pressure, turbid, and with excess of polymorphs, without growth of organisms during this period. Temperature rising as high as 103°, with pulse, 140. Temperature normal since November 7, and patient bright, eating and sleeping well.

Dr. TURNER replied that it was unfortunate that the case was post-operative meningitis, and also that the labyrinth had not been investigated prior to operation. He was sure, however, that the child's life was saved by the prompt measures taken; the meninges were drained within thirty hours of the operation. The way in which the patient became worse when the fluid ceased to flow through the labyrinth and again improved with the restarting of the flow was very instructive. The organisms from the cerebro-spinal fluid did not grow on culture. It was not a very malignant type of meningitis. With regard to the urotropine, only 10 grains were given in the case of a child, but 30 and 40 grains have been injected in these meningeal cases, and it was stated by Flexner and others that there was no use giving it unless by injection.

Calculus of the Tonsil.—J. Walker Downie.—(a) Man, aged forty-five; no history of gout or rheumatism. He had had frequent attacks of peritonsillar suppuration, and when seen he had an ulcerated area over the right supra-tonsillar area which was caused by the pressure outwards of a calculus. This was extracted at this place. The surface of the calculus is comparatively smooth and hard, and resembles a well-formed phosphatic urinary calculus. Calculus shown.

(b) Man, aged fifty-seven, had had many severe and prolonged attacks of gout. History of frequent sore throat, chiefly on left side, but no history of suppuration. He was referred to exhibitor on account of a somewhat painful swelling of the left side of the soft palate immediately above the tonsil, hard to the touch. It was feared it might be malignant. Under local anaesthesia an incision over the swelling exposed a large hard calculus. This was removed by means of a steel spoon extractor. Calculus shown.

Among other exhibits Dr. W. G. Porter showed a **Series of Skiagrams illustrating the Anatomy of the Mastoid Region.**

Dr. TURNER remarked that there was one point which he thought would be settled, namely, that the mastoid cells did not pass beyond the

sutures. They had examined more than 500 skulls in the last month or two and had never yet found a case, even where the mastoid cells were widely distributed. Statements in text-books were made to that effect, but they had never seen it.

Dr. SYME remarked that what Dr. Porter gave with one hand he took away with the other. If there were many cases of asymmetry, the value was taken away.

Dr. PORTER replied that that was one of the points under investigation.

Dr. J. D. Lithgow: Convenient Form of Steel Wire Saw for the rapid and safe removal of the "bridge" in the radical mastoid operation. Patient and specimen shown in illustration of the use of the instrument.

Dr. FRASER said he did not feel inclined to try steel wire. He thought otologists had very wisely given up Stacke's protector and should not take to passing wire through the meatus. He thought the most important part of the radical operation was the integrity of the oval window and stapes; there was distinct risk of injury to the stapes.

Dr. LITHGOW said it would be used where the tympanic membrane was largely wanting. As the wire was held 2 or 3 in. from the end, the bending of the wire to the slightest obstruction would indicate whether one were using undue pressure or not. By its use about ten minutes might be saved. The method was employed by von Stein.

Dr. SYME did not think it should go forth that otologists had given up Stacke's protector. Those who had never used it could not give it up. Personally he always used it and knew others who did so too. The same thing was said in one of the medical papers and brought forth a letter in the *Lancet* or *British Medical Journal*. He had never seen any damage caused by the introduction of Stacke's protector. He introduced it from the antral side.

Dr. TURNER said that they had not used Stacke's protector in Edinburgh for some years.

INTERNATIONAL CONGRESS OF MEDICINE.

London, August, 1913.

SECTION XV.—LARYNGOLOGY.

SIR STCLAIR THOMSON, *President, in the Chair.*

Abstract Report by DAN MCKENZIE.

(For President's Introductory Remarks, see JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. XXVIII, p. 565.)

Discussion on the Recent Progress of Endoscopic Methods as Applied to the Larynx, Trachea, Bronchi, Œsophagus and Stomach.

Report by PROF. GUSTAV KILLIAN (*Berlin*).

The Direct Method in the Years 1911 and 1912.

After a few introductory remarks, PROF. KILLIAN went on to speak of: *Direct Laryngoscopy*.—The difficulties of anæsthesia in little children were avoided by Jackson, who used no general anæsthesia at all in early

life. Several instruments had been devised by which simultaneously an anæsthetic could be given and the examination made.

Position.—The speaker preferred, in children, the lateral position, which materially facilitates the introduction of the spatula. The surgeon stands in front of and not behind the patient. One may begin with the head straight or inclined somewhat backwards.

Congenital stridor in children has been investigated by the direct method, but more investigation is required. The epiglottis has been seen to be aspirated into the larynx and the same has been observed of the arytaenoid region. The speaker suggested that the stridor might be primarily a neurosis related to irritative glottic spasm. In laryngismus stridulus the vocal cords are approximated during inspiration.

Singers' nodes have been successfully treated by the direct method. But the greatest use of direct laryngoscopy has been seen in the treatment of laryngeal papilloma in children. Two distinct varieties are described: one circumscribed and easy to treat, and the other diffuse, recurrent, and often incurable.

Brinings has been trying the effect of the X rays in laryngeal tuberculosis, but the practical difficulties were great and the results inconsiderable.

In those cases in which the prolonged wearing of a tracheotomy tube is necessary direct laryngoscopy has proved of service in disclosing the cause of the obstruction and in leading to rational treatment. Adhesions following intubation have been divided, granulations removed, and stenoses dilated by rubber tubes, etc.

The mistaken diagnosis of diphtheria for a foreign body and *vice versa* may be cleared up by direct examination, and finally foreign bodies are easily removed from the larynx by the direct method.

Suspension laryngoscopy is of special value in the treatment of laryngeal papilloma in little children, and it is of great service in the treatment of laryngeal tuberculosis. In carrying out the examination the base of the tongue should first of all be raised, and then with a special elevator the epiglottis is raised up and the interior of the larynx reached. Counter-pressure on the cricoid brings the anterior commissure into view.

Upper and Lower Tracheoscopy.—A congenital diverticulum of the trachea has been described, and stenosis from fracture. Bleeding from dilated veins on the posterior wall of the trachea has been successfully combated with chromic acid.

Membranous bands following diphtheria and scarlet fever have been found causing tracheal obstruction, and attention has been drawn to the advisability of direct examination of the trachea when tracheotomy fails to relieve respiratory obstruction.

Our knowledge of syphilis of the trachea has been extended, tracheal gummata and ulcerations having been observed, the latter sometimes being very extensive, with perforation, in some instances, of the œsophagus and aorta. These ulcerations often lead to stenoses.

Scleroma affecting the trachea has been seen as far as the carina with consequent narrowing of the lumen of the bronchi.

Of neoplasms, papilloma and enchondroma have been observed, and enlarged glands outside the windpipe have been found causing troubles such as compression and ulceration into the tube, and from the same cause the trachea may be displaced. Cancer of the trachea, both primary and secondary, has been noticed.

Of foreign bodies, some sixty-five cases have been recorded; in most

of them extraction was successfully accomplished. Among them was a case in which a piece of the pharyngeal tonsil had found its way into the trachea during general anæsthesia.

Upper and Lower Bronchoscopy.—For the examination of little children the avoidance of subglottic œdema necessitates the use of narrow, fine-walled tubes without any inner tube. Introduction is cautiously effected through the subglottic space with the aid of a hollow mandrin. A small accessory tube is sometimes supplied for the administration of the anæsthetic. As in direct laryngoscopy the passage of the bronchoscope under general narcosis is most easily carried out when the patient is lying on his left side. The bronchoscope may also be passed through the laryngeal spatula.

Bronchial bleeding, from wounding by a foreign body, has been observed and successfully treated with adrenalin. Chronic bronchitis has been combatted by the direct application of sprays, etc., and syphilitic lesions similar to those already described as occurring in the trachea have been found. Dilatation of bronchial stenosis has been undertaken with benefit.

Fibroma and carcinoma of the bronchi, the latter in a girl, aged twenty-three, have been reported.

Like the trachea, the bronchi are occasionally compressed by anthracotic mediastinal glands, and cases have been described in which calcification of these glands has led to the expulsion of "lung-stones," and in one case anthracotic glands surrounding the trachea and bronchi were successfully removed by mediastinotomy.

Tuberculous mediastinal glands behave in a similar fashion, and occasionally when they break down rupture into a bronchus.

A remarkable communication (Kahler) on auricular compression of the left bronchus has been described. Dilatation of the left auricle pushes the left bronchus further laterally and may even cause it to bend sharply, since the bronchus lies on the left auricle as on a cushion.

Foreign Bodies in the Bronchi.—Too many patients are still allowed to die from the effects of foreign bodies in the bronchi; both acute and chronic pulmonary disorders may occur and a foreign body never be suspected. X-ray examination is often negative even when the foreign body is metallic.

Of those cases in which extraction has been attempted the great majority recover. Most cases occur in children, the youngest on record being three months old. Most come for treatment early, but sometimes months and even years are allowed to lapse before removal is attempted.

Of all foreign bodies beans and similar seeds, etc., are the most dangerous. Out of twelve such cases five died. In the case of beans *tracheotomy should always be performed* before the examination is attempted, and *lower bronchoscopy* resorted to unless the case is brought for treatment *within a couple of hours* after the aspiration.

The mortality of foreign bodies in the bronchi removed by *upper bronchoscopy* is now between 8 per cent. and 9 per cent. In the "laryngoscopic period" the mortality was 30 per cent., and before that 52 per cent.

Of dangerous sequelæ, subglottic œdema, pneumonia and lung abscess were mentioned, together with one case of pneumothorax after a difficult extraction. It recovered.

Lower Bronchoscopy for Foreign Bodies.—Tracheotomy has proved a necessity in cases in which the foreign body was too large to be removed through the glottis.

The mortality is 11 per cent.—double that of upper bronchoscopy, because of the more difficult cases being tackled by this method. The mortality of both methods taken together is 10 per cent.

Asthma.—Of recent years the treatment of asthma by the spraying of cocaine and adrenalin into the bronchi has taken a great swing upwards. Ephraim uses a curved tube so as to avoid the frequent introduction of the (straight) tube. It can be introduced into the right or left bronchus by altering the position of the body. Ten to 15 drops of a 1-1000 sol. adrenalin (adults) are sprayed into the bronchi. From his own experience the speaker could warmly recommend the treatment. Permanent results had been obtained in a considerable percentage of cases.

Pulmonary disease, even when acute, does not contra-indicate bronchoscopy, as the experiences in the removal of foreign bodies have shown.

Neoplasms of the lung are commoner than is supposed; most of them originate in bronchi. Carcinoma, endothelioma and an amyloid tumour in the neighbourhood of the bifurcation have been described.

Œsophagoscopy.—*Deaths:* The mortality of the simple examination seems to be about 1 per cent.

Instruments: Allusion was made among others to the use of instruments for dilating the gullet for the removal of large foreign bodies.

Disease of the œsophagus: Much still remains to be done as many conditions known to pathologists have not yet been examined with the œsophagoscope. For example, œsophageal hæmorrhage is not invariably due to disturbances in the portal circulation. Simple erosion may induce severe bleeding.

Gangrenous ulceration has been found in scarlet fever, and it is suggested that this may be followed by stenosis.

Abscesses of the gullet have been found and opened from within.

Little is known about syphilis of the œsophagus. It may set up changes which are mistaken for cancer. Gummata and fistula formation into the trachea have been recorded.

Of tumours, simple polypus and myxoma have been found. But cancer is of course the most common neoplasm. Of Guisez's cases three fourths were malignant. Ulcerating, proliferating and infiltrating forms have been described as the types of the disease. Proof-excision of carcinoma of the cardia was followed in one case by fatal peritonitis. The use of radium and mesothorium has been followed by considerable benefit, and highly situated carcinoma has been successfully removed by operation.

Simple stenosis of the œsophagus is often difficult to account for, but some cases are perhaps legacies left by scarlet fever and diphtheria in childhood or it may be due to smallpox or syphilis.

Congenital atresia of the œsophagus has often been described, but it has not often been examined with the œsophagoscope. Lubliner, however, has done so in a child two days old. Stenosis may follow œsophagoscopy, especially when cauterising agents penetrate deep into the tissues.

Regarding the treatment of œsophageal stenosis the speaker warned against internal œsophagotomy, which has led to death on several occasions. The best results seem to have been achieved with the aid of a swallowed string after gastrotomy, olives and bougies being passed up and down under its guidance.

Mention was also made of the spasmodic contraction of the upper and lower ends of the œsophagus, and of compression stenosis by goitre, mediastinal tumours, etc. As a rule, narrowing of the lumen, whether temporary or permanent, is associated with dilatation of the segment of

the œsophagus above the stricture; this applies to spasmodic as well as to organic stricture, and stricture at the cardia may lead to enormous distension above it. In this condition treatment by dilators leads to cure.

Several cases of traction diverticulum have been examined! Removal was attempted by operation in one case, with death from mediastinitis.

Foreign Bodies in the Œsophagus.—The speaker emphasized anew the danger of blind attempts at removal, and expressed the opinion that manipulation through the œsophagoscope was not everybody's business.

A large number of cases have been recorded, in patients whose ages vary from four days to ninety-two years, in most of which extraction was successful. The œsophagus does not tolerate foreign bodies as the air-passages do, for this reason few long-standing cases are on record. Ulceration and mediastinitis develop, and fistula may open into the trachea or the aorta may be punctured. Rough or blind efforts at removal may also inflict serious injury. But those cases are quite rare. If extraction is impossible œsophagotomy may be necessary.

When the œsophagus is narrowed, stenosis may lead to retention of a foreign body which would otherwise be small enough to pass.

Gastroscopy.—The number of cases examined in this way is still limited. Chevalier Jackson's, Elsner's and Hill's instruments were described in detail. It is unfortunate that those who take special interest in gastric diseases do not adopt gastroscopy. It is questionable whether the future will show much change in this respect.

(To be continued.)

CLINICAL CONGRESS OF SURGEONS.

London, 1914.

This International Congress of Surgeons will be held in London, beginning July 27, 1914.

The headquarters of the Congress will be at the Hotel Cecil, with headquarters for the division of surgical specialities at the Savoy.

Arrangements have been made to furnish visitors with ample opportunities of becoming acquainted with the work of the different London hospitals, general and special.

There will also be sessions on each evening of the week, excepting Saturday, at which distinguished British, American and Continental surgeons will present papers dealing with subjects of present-day surgical interest. The Presidential Meeting occurs on Monday evening at the Cecil, at which time the newly-elected President, Dr. John B. Murphy, will deliver the annual address.

The session in the ball-room of the Savoy on the Tuesday evening will be devoted to the surgery of the nose and throat, as follows:

Prof. E. Schmiegelow, Copenhagen, Denmark, "The Result of Operations (Laryngo-fissure) for Cancer of the Larynx." Discussion by Sir StClair Thomson, London.

Dr. J. M. West, Berlin, Germany, "The Intra-nasal Surgery of the Lachrymal Apparatus, after an Experience with over 225 Operations." Discussion by Dr. D. R. Paterson, of Cardiff.

On the Wednesday evening, in the same room, the papers will deal with otological subjects, as follows:

Dr. A. Logan Turner, Edinburgh, "The Application of Skiagraphy to the Mastoid Region and its Use in the Detection of Disease." Discussion by Mr. Sidney Scott, London.

Mr. Hugh E. Jones, Liverpool, "Some Considerations which Determine the Extent of an Operation in Septic Invasion of the Lateral Sinus." Discussion by Mr. Hunter Tod, London.

The London Committee of Arrangements is composed of one representative from each of the hospitals which are co-operating, Sir Rickman J. Godlee, Bt., honorary Chairman, Mr. H. S. Pendlebury and Mr. Herbert Paterson, honorary secretaries. The Secretary-General of the Congress is Dr. Franklin Martin, 1, Wimpole Street, W.

Abstracts.

PHARYNX.

Mayer, E. (New York).—Primary Carcinoma of the Epiglottis, with Report of a Case operated on by means of Suspension Laryngoscopy. "Arch. für Laryngol.," vol. xxvii, Part III.

After referring to the literature of this somewhat rare condition, the writer describes a case in which he met with a very early cylindrical-celled cancer of the laryngeal surface of the epiglottis. That the disease was of recent origin was certain because the writer had examined the patient's throat three weeks previously, and had found it normal. In suspension laryngoscopy under general anæsthesia the epiglottis was seized with catch-forceps and amputated with a knife. There was little bleeding at the time, but a quantity of blood was expectorated twenty-six hours later, the hæmorrhage, however, ceasing on the application of cold. The patient remained well at the time of writing (eight months after the operation). It is claimed that this was the first operation of the kind performed by means of suspension laryngoscopy.

Thomas Guthrie.

Jolly, R. H. H.—A Case of Osteomyelitis of the Sphenoid Bone following Removal of Adenoids. "Lancet," June 21, 1913, p. 1734.

A boy, aged fifteen. Adenoids and tonsils removed seventeen days previously. Considerable hæmorrhage four days later, with slighter loss each succeeding day. Severe headache one week, swelling of eyelids one day. Temperature 102°–105° F. Pulse 140, respirations 56. A rigor occurred shortly after admission, followed by coma and death in four days. There was purulent meningitis, pus in the sella turcica and at the back of both orbits. The entire body of the sphenoid was broken down and caseous, with small foci of pus, a definite connection being traceable to the posterior naso-pharynx. Cavernous sinuses contained purulent thrombi. Tonsillar fossæ fairly normal, but the upper part of the posterior naso-pharynx was full of foul, purulent slough.

Macleod Yearsley.

Wilson, W.—Some Causes of Disappointment following Removal of Tonsils and Adenoids. "Lancet," 1913, vol. ii, p. 1612.

A valuable paper, and one that should be read by all general practitioners who do adenoid operations. Wilson refers to the extensions of the adenoid mass into Rosenmüller's fossæ, and their effect upon the action of the levator and tensor palati and the salpingo-pharyngeus. He also points out the necessity for removal of enlarged posterior ends of inferior turbinals and the importance of careful after-treatment by (1) breathing exercises, (2) Politzerisation, and (3) orthodontal treatment when necessary.

Macleod Yearsley.

Warner, Francis.—Development of the Pharynx by Muscular Exercises after Operation for Adenoids, with Special Reference to Feeble-minded Children. "Lancet," 1913, vol. ii, p. 1758.

The exercises advised are of the pterygoid muscles, for the purpose of developing the bony boundaries of the pharynx. These are combined with special breathing exercises, and require the combined co-operation of the doctor, the teacher, and the drill-instructor. The paper requires to be read *in extenso*.

Macleod Yearsley.

NOSE.

Levinstein, Oswald (Berlin).—Intra-nasal Opening of the Maxillary Antrum. "Zeitschr. f. Laryngol.," Bd. vi, Heft 3.

The author admits that it is impossible to curette out diseased mucous membrane through an intra-nasal opening, and further, that it is impossible to see what one is doing in many cases, so that the operation must be performed by "feel" alone. It is useless to bother about making a flap from the nasal mucous membrane if one only performs the intra-nasal operation on the antrum, because a flap is only of use when the mucosa of the antrum has been removed.

Levinstein defines the objects of intra-nasal opening as (1) drainage, (2) easy access to the antrum for lavage through the antrum. According to the statistics of Claoue, Berens and Myles, about 80 per cent. of cases of antral suppuration are cured by intra-nasal opening.

Various methods have been suggested for intra-nasal operation on the antrum: (a) Gerber and Kubo recommend an opening in the middle meatus, but this route renders subsequent lavage by the patient very difficult. (b) The usual method is to remove the anterior end of the inferior turbinal, and then to bore through the inner wall of the antrum and enlarge the opening with bone-cutting forceps. Levinstein says that after this operation scabs and crusts form on the operated side on account of the tendency to dryness of the nose. Further, the patients often suffer from neuralgic pains for many months.

Hirsch and Ruttin have modified this method in so far that they recommend only a temporary resection of the inferior turbinal. This makes the operation very difficult, especially in narrow noses. (c) Levinstein himself proposes a submucous instead of a transmucous operation, and holds that resection of the inferior turbinal is not necessary.

Dahmer, Roe, Sturmman and Skillern have already described a submucous intra-nasal operation on the antrum. Of these writers the first

two remove the anterior end of the inferior turbinal, while the two latter attack the antrum from the outer bony margin of the pyriform aperture.

The stages of Levinstein's operation are as follows: (1) The nasal mucous membrane is painted with 20 per cent. cocaine with a little adrenalin. (2) Two c.cm. of 1 per cent. novocaine with 15 drops of adrenalin are injected into the mucosa of the outer wall of the inferior meatus and floor of the nose. (3) The mucous membrane of the outer wall is incised with Freer's knife parallel to the anterior end of the inferior turbinal; the cut extends down to the floor of the nose. (4) The muco-periosteum is raised with Freer's elevator from the outer wall of the inferior meatus. (5) The detached muco-periosteum is cut with scissors as near as possible to the attachment of the inferior turbinal and the flap turned back out of the way against the septum. (6) The inner wall of the antrum below the level of the inferior turbinal is now removed with chisel, trephine or forceps. The anterior part of the inner wall of the antrum must be completely removed along with any projecting ledge of bone between the nasal and antral floors (this part of the operation is best performed with a bent gouge). (7) The mucous membrane flap is removed over an area which corresponds to the hole made in the inner wall of the antrum. After-treatment is on the usual lines.

J. S. Fraser.

LUC, H.—Route of Access to the Ethmoidal Labyrinth by Harris Mosher's Method. "*Annales des Mal. de l'Oreille, du Larynx, du Nez, et du Pharynx*," vol. xxix, No. 6.

The author remarks that, on examining the outer wall of the nasal fossa in a sagittal section, a rounded eminence presents itself immediately in front of the anterior extremities of the superior and middle turbinated bodies, which corresponds to the innermost peri-infundibular cell, or the cell of the *agger nasi*. This is the situation where Mosher enters the ethmoidal labyrinth. A curette applied at this point with pressure directed outwards will enter a cavity bounded externally by the lachrymal bone, anteriorly by the nasal process of the maxilla, posteriorly by the bulla ethmoidalis, and superiorly by the frontal sinus, which usually opens at its anterior and external part. Mosher's technique is as follows: Complete anesthesia and ischemia are effected by cocaine and adrenalin applied locally. The head is then held in a position of hyper-extension, in order to bring the point of attack well into view. The curette is now applied over the *agger eminence* with pressure directed towards the lachrymal bone. Should the osseous wall yield, one will be in the right direction; if not, the curette must be applied a little higher and more posteriorly. As soon as the bone gives way, the instrument enters a space in which it is freely mobile. The breach is now extended by turning the cutting edge of the curette backwards and working from above downwards and from without inwards; thus the bulla ethmoidalis is opened and the middle turbinated body partially detached. The curette is afterwards directed against the posterior border of the nasal process. An appropriately curved probe can now be passed through the antero-external portion of the roof of the cavity into the frontal sinus, and by substituting a small curette with conveniently curved shank, the fronto-nasal communication can be enlarged at will. In proceeding with the posterior ethmoidal cells and sphenoidal sinus, Mosher recommends that the head be held vertically. The curette is applied along the attachment of the middle turbinal, which serves as an important guide in opening the posterior cells. The author emphasises the danger of entering the cranial

cavity when the operator approaches the neighbourhood of the superior and outer extremity of the hindermost ethmoidal cell, here the party-wall is exceedingly thin, offering little resistance, and still less, in cases of prolonged suppuration. For this reason both Mosher and Luc insist on the patient's head being maintained in the vertical position during this stage of the operation. A capacious posterior ethmoidal cell has been mistaken for the sphenoidal sinus; this can be avoided by carefully differentiating the internal portion of the anterior surface of the sphenoid from the outer portion in relation with the ethmoidal labyrinth. The line of demarcation of these areas is clearly defined by the posterior end of insertion of the superior turbinated body. Mosher therefore advises, after complete resection of the middle turbinated body, detachment of the superior close up to the sphenoidal wall, and to break down the latter inwards from the insertion in question, taking as a supplementary landmark the superior border of the choana.

H. Clayton Fox.

LARYNX AND TRACHEA.

MacMahon, Cortlandt.—**Functional Aphonia: A Method of Curative and Preventive Treatment.** "Lancet," March 1, 1913, p. 632.

The method detailed is not intended to take precedence of intra-laryngeal faradism in hysterical and neurotic subjects, but is advocated for stubborn cases which do not yield to ordinary treatment. In dealing with cases of aphonia the first thing to be acquired is the ascent of a definite and adequate air column, which can be passed at will through the larynx, and the author insists upon the careful teaching of marked inferior lateral costal expansion during inspiration, followed by strong and deliberate contraction of the abdominal muscles.

In overcoming and preventing functional aphonia the great essentials to be sought are resonance and freedom from all constriction. These can be acquired by the possession of a definite air column, free lip movement, a low pitch of voice, and a knowledge of the resonator positions.

Macleod Yearsley.

Mygind, S. H. (Copenhagen).—**Acute Rheumatic Arthritis of the Crico-arytænoid Joint and Conditions resembling it from the Clinical Standpoint.** "Archiv. für Laryngol.," vol. xxviii, Part I.

The literature contains very few recorded cases of rheumatic fever complicated by an affection of the crico-arytænoid joint. About twenty-five have been reported, but of these only seventeen are beyond question; the author adds one to their number. For the establishment of such a diagnosis he considers it necessary that there should in the first place be extra-laryngeal symptoms of an acute rheumatic infection, such as fever and affection of other joints, and in the second place there must be evidence of a primary serous synovitis of the crico-arytænoid joint—that is to say, limitation of movement and swelling in the neighbourhood of the joint. It is conceivable, however, that in rare instances the crico-arytænoid may be the only joint affected.

In the case which the writer records a woman suffered from a mild attack of rheumatic fever with multiple joint affection, during the subsidence of which the presence of a laryngeal complication made itself known by the onset of hoarseness, dysphagia, and dyspnoea. Examination

showed great œdema of both arytaenoids, marked limitation of adduction and abduction, especially the latter, tenderness on pressure over the joints, and swelling of the cervical lymph-glands. The symptoms subsided under treatment with sodium salicylate, and there remained six weeks later only slight swelling of the arytaenoid region and a little impaired mobility of the cords, particularly on abduction.

The condition has been met with chiefly in women between the ages of eighteen and forty-five years. Hoarseness and dysphagia are always present; dyspnoea is recorded in about one half of the cases, but tracheotomy has never been required.

Similar conditions are occasionally met with in association with gout, gonorrhœa, chronic rheumatism, and certain of the infectious fevers.

Thomas Guthrie.

ŒSOPHAGUS.

Johnston, Richard H.—The Removal of Foreign Bodies from the Upper End of the Œsophagus. "Laryngoscope," July, 1913.

This paper advocates the use of short and wide instruments with the head in the "straight" position. It is laid down that while it is possible, with the head in the extended position, to examine the œsophagus, the examination is made more difficult, both by the necessity of having a trained assistant to support the head and by the muscular tension induced. The examination can, however, be easily performed by simply allowing the head to lie straight on the table. The author has used this position with success on children up to eight years of age without an anæsthetic, and has found that with a Jackson's child's speculum, introduced to the cricoid level, a view of the œsophagus down to the level of the clavicle is easily obtained. He advocates local anæsthesia with the sitting position and slight extension of the head for the examination in adults.

A. J. Wright.

EAR.

Heschl, Friedrich.—The Relation of Air- and Bone-Conduction in Obstructive Deafness. "Monatss. f. Ohrenh.," Year 47, No. 9.

The lengthening of bone-conduction in lesions of this class is, says the author, one of the oldest established facts in the investigation of deafness, and one for which many suggestions have been offered in explanation. Of these, although he is inclined to consider the theory of Mach in part acceptable, yet more research is wanted in this direction. (Mach's theory suggests that the same obstruction which hinders the passage of the sound-waves *via* the middle ear also prevents the dissipation of sound by bone-conduction, so that the effect of the latter on the perceptive apparatus is augmented.)

With this end in view the following examinations and tests were carried out: The fundus was first inspected, and then the range for conversation and whisper ascertained. The difference in point of time between the appreciation of the tuning-fork by the examiner and patient was next noted as "Air-conduction-difference." The "Bone-conduction-difference" was similarly noted, *viz.* Schwabach's test. (Bárány's modification¹ of this was not apparently adopted, nor was

¹ JOURNAL OF LARYNGOL., RHINOL., AND OTOL., p. 611, 1909.

notice taken of Gelle's test.) The results to Rinne's and Weber's tests were also noted. The difference between the bone-conduction of the patient and the air-conduction of a normal ear in addition, as suggested by Frey, was ascertained, as well as the difference of their air-conduction. With these and other data an exhaustive investigation was carried out on three cases of acute middle otitis, nine cases of acute tubo-tympanic catarrh, one case of a traumatic lesion of the inner ear, two cases of impacted cerumen, and, lastly, three normal hearing people, in whom an artificial obstruction had been produced by a plug of wool soaked in oil, the general idea being to obtain a record as regards these functional tests both before and after the varying obstruction was removed.

These results are represented in a series of tables, an example of accuracy, energy and method, and the article concludes with a summary as follows:

(1) In deafness due to obstructive agencies the bone-conduction will always be found lengthened.

(2) After removal of the obstruction in these cases the hearing always improves, but the lengthening of the bone-conduction does not decrease in all cases.

(3) The effect on the bone-conduction varies as to whether the obstruction is in the outer ear passage or middle ear. If the obstruction be in the outer ear passage its removal produces an improvement in hearing and a corresponding decrease in the lengthening of the bone-conduction. If, however, the obstruction be in the middle ear its disappearance may indeed mean a marked improvement in hearing, but the lengthening of the bone-conduction may be only slightly affected. After the affection has subsided the air-conduction may become almost entirely as good as formerly, but the lengthening of the bone-conduction may remain.

(4) Inflation produces its greatest result at the first sitting; the improvement at subsequent inflations is more gradual.

(5) The power of perception by normal people varies: a fact that must be noted in distinguishing pathological and physiological conditions.

(6) There is sometimes a marked disagreement between the improvement of the range of hearing for speech and the increase in the air-conduction.

From these conclusions, therefore, Heschl does not consider that Mach's theory satisfactory for all instances of obstructive deafness, since, according to this, removal of the obstruction should be followed by restoration to a normal bone-conduction, which latter, as he claims to have shown, only occurs in cases where the obstruction was located in the outer ear passage. Middle-ear affections, he contends, must be associated with other changes which commence in the course of the affection—as is demonstrated by certain cases in which the lengthening of the bone-conduction increases during the subsidence of the attack—and lead to conditions that accentuate the force of the sound by cranial conduction.

Alex. R. Tweedie.

Jaehne, A.—The Clinical Aspect of Herpes Zoster Oticus. "Arch. f. Ohrenheilk.," Bd. 93, Heft. 3 and 4.

A case of herpes zoster oticus is reported and the literature analysed.

The patient was a male, aged twenty. In the course of a general infection characterised by fever, depression and jaundice, a herpetic rash broke out on the concavity of the right auricle and inside the external

meatus. The tympanic membrane was reddened, but there was no bulging. A few days later, severe pain in the right ear came on, with headache, vertigo, nausea and deafness, and the right side of the face became completely paralysed.

After a few days the general symptoms began to disappear. The temperature fell to normal and the jaundice cleared away, while at the same time the vertigo gradually became less troublesome, although the patient still fell (towards the right) when standing up. The deafness, however, which was very severe, persisted and the facial paralysis showed no improvement. The caloric reaction was absent from the right ear and present in the left. Wassermann negative.

Six, even eleven months after the onset of the disease no alteration had taken place in the face or in the hearing, and it is noted that the sense of taste for salt, acid, sweet and bitter, was absent from the right side of the tongue.

In comparing this case with the others which appear in the literature, the author observes that persistence of the paralytic phenomena is unusual, although, in point of fact, complete recovery also seems to be exceptional. In most of the cases some amount of improvement took place.

Dan McKenzie.

Cavanaugh, John A.—*Topography of the Tympanic Cavity.* "Annals of Otology," xxii, p. 699.

A useful paper, illustrated by four plates, which requires to be read in its entirety.

Macleod Yearsley.

REVIEW.

Geschichte der Ohrenheilkunde (History of Otology). By Dr. ADAM POLITZER (Emeritus Professor of Otology in the University of Vienna, Emeritus Director of the University-Aural Clinic in the General Hospital of Vienna, Royal and Imperial Court Councillor). In two volumes. Second volume from 1850 to 1911; with the co-operation of well-known colleagues. 29 illustrations on 29 plates. 474 pages. Stuttgart: Ferdinand Enke, 1913.

The first volume of this valuable work brought us from the times of the ancient peoples of the East up to the middle of the Nineteenth Century. The second volume, though limited in its scope to little over sixty years, occupies as many pages as the first, and if less stimulating to the historical sense is imbued with at least quite as much practical interest. So great is the amount of material for recording during these active years that the author apologises because in order not to overstep such limits of space as render the whole survey difficult he has had to confine himself to the most important features alone. The selection of the subjects according to their importance has been carried out with such judgment and such complete knowledge that a good historical account is given within modern compass and without any sacrifice of readableness.

The author's high estimation of Toynbee's work would almost justify us in dividing the history of Otology into two eras—the præ-Toynbeean and the Toynbeean, and it is with the latter that the second volume is concerned.

The first half of this volume is arranged on the basis of a "subject" classification, with such chapter headings as "The Investigations in the

Anatomy of the Organs of Hearing since 1850." "The Physiology of the Organs of Hearing since 1850," "The Pathological Anatomy of the Organs of Hearing since Toynbee," etc., etc., including "Progress in the Examination of the Ear," "The History of the Mastoid Operation, of Otosclerosis, Labyrinthine Suppuration, and Deaf-Mutism." It is most interesting to read under each heading the *résumés* of the contributions of the various authors in their chronological sequence and to call to mind our former readings when many of them conveyed information which was then new and startling, though now in many cases ordinary everyday working knowledge. The British reader cannot without pride observe how important were the works of those of his countrymen who were pioneers in otology. We could have wished, however, to see a reference to Newton Pitt's remarkable Goulstonian Lecture, in which, as far back as 1890, he compiled and analysed the reports of all the cases of death following suppurative disease in the middle ear recorded in the *post-mortem* register of Guy's Hospital during a considerable number of years. The relative frequency of cerebral abscess, pyæmia and meningitis as incidents and as causes of death respectively was here shown on a large scale for the first time.

The second part (pages 215-474) is classified according to the countries in which the various workers are born. Thus we have all the countries of Europe and their dependencies, including the various Balkan States, the United States of America, the South American Republics, and Japan. In the section on Great Britain the history is divided into two periods—the first that of Toynbee, Wilde and Hinton, the second that of their followers down to the present day, whether in the British Isles or the various dependencies. The list of names is a very extensive one, and many of our own appear in it, credited with such contributions as seem to have been thought useful. Among the names of those who have passed away, that of Bendelock Hewetson might have had a place, in view of the wide recognition given abroad—even more than at home—to his treatment of acute inflammation of the middle ear by means of carbolised glycerine. The difficult and delicate task of preparing this chapter has been admirably carried out by Dr. Middlemass Hunt, of Liverpool. The portraits of Toynbee and Wilde are characteristic and striking.

While otology was in England established on a foundation of pathological anatomy by Toynbee and made rapid progress in consequence of his work, it was in Germany retarded by the influence of Kramer, who entertained the most antipathetic views in regard to the study of otology from the side of morbid anatomy. "To von Tröltzsch is due the credit of having imparted the impulse to the modern scientific development of otology in Germany as the result of the inspiration derived from Toynbee and Wilde" (page 244). How rapid and vigorous this development was is shown most strikingly in the pages devoted to the records of the German investigators living and dead. Among the latter were von Tröltzsch, Moos, Steinbrügge, Gruber, Schwartz, Bezold, and many others whose names are familiar. Among the former there stands out in unavoidable relief the name of the author of this history, whose life and work are models for imitation. Few are those, however, who come provided with the various technical, artistic and linguistic gifts by which Prof. Adam Politzer is distinguished, as well as indefatigable industry and bodily vigour. Very interesting to us is the tribute he pays to Toynbee, under whom he studied in London in his earliest days.

The continuation of the history of otology in other countries affords

interesting reading. In France we have the period under consideration illuminated by Ménière, in Russia by Wreden (describer of "obstructing keratosis of the external meatus") and Prussak, in Belgium by Delstanche, in Italy by Sapolini, in America by Turnbull, Knapp, St. John Roosa (whose text-book ranked amongst the very best of its time) and others, of whom many are still living and active workers.

The volume is enriched with plates, which form quite a portrait-gallery of otologists who have died indeed, but who live in the memories of all those practitioners of otology who have the grace to acknowledge their indebtedness to these founders and builders-up of their art.

The whole work is one which inspires us with pride in the steady, rational development of otology, and with gratitude to the illustrious worker and exponent who has placed its history before us in this instructive and fascinating form.

Dundas Grant.

NOTES AND QUERIES.

INTERNATIONAL CONGRESS FOR DISEASES OF OCCUPATION.

The third International Congress for Diseases of Occupation will meet in Vienna, from September 21 to September 26, 1914. The Secretary of the British Committee is W. F. Dearden, 168, Trafford Road, Salford, Manchester. There is a special Section on the harmful effects of occupation upon hearing, at which papers will be presented by several prominent Continental and American otologists. The Secretary-General of the Congress is Dr. L. Teleky, Vienna IX, Türkenstrasse 23.

ERRATUM.

In the abstract of R. Leidler's article on "The Indications for Labyrinthotomy," which appeared in the April number of the present volume (p. 220 and seq.), we regret that, owing to a slip, the symptoms of acute diffuse labyrinthitis are made to include "nystagmus of the third degree to the *affected* side." This, of course, should read "to the *sound* side."—D. M.

We have much pleasure in intimating that Dr. Dundas Grant has completely recovered from his recent attack of appendicitis, and that he has returned to active work.

BOOKS RECEIVED.

Eye, Nose, Throat and Ear. By *James Forrest, M.B.* Price 10s. 6d. net. London: Henry Kimpton, 1914.

Development and Anatomy of the Nasal Accessory Sinuses in Man. By *Warren B. Davis, M.D.* Philadelphia and London: W. B. Saunders Company, 1914.

Text-book of Local Anæsthesia. By *Prof. Dr. Georg Hirschel.* Price 8s. 6d. London: John Bale, Sons & Danielsson, Ltd., 1914.

The Diseases of Children. Edited by *Dr. M. Pfaundler* (Munich) and *Dr. A. Schlossmann* (Düsseldorf). English translation edited by *Henry L. K. Shaw, M.D.* (New York) and *Linnæus La Fêtra, M.D.* (New York). With an Introduction by *L. Emmett Holt, M.D.* (New York). Vol. VI, "Diseases of the Ear," *Arthur J. Bedell, M.D.* (New York). Philadelphia and London: J. B. Lippincott Company, Price 21s. net.

L'Oreille et ses Maladies. By *Theodore Heiman.* 2 Vols. I Partie Générale. II Partie Spéciale. Paris: G. Steinheil, 2, Rue Casimir-Delavigne, 1914.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

THE SEMON LECTURE, 1914.

(*Delivered on May 28th, 1914.*)

SUSPENSION LARYNGOSCOPY AND ITS PRACTICAL USE.

BY PROFESSOR GUSTAV KILLIAN,
University of Berlin.

Translated by Dr. D. R. PATERSON.

I. HISTORICAL.

ON April 23, 1895, Kirstein, of Berlin, saw the interior of the larynx without a mirror for the first time. On that memorable day our speciality broke altogether new ground. Most of you are already familiar with the way Kirstein, in a very short time, developed direct laryngoscopy. Notwithstanding the zeal and enthusiasm with which he strove to make known and extend the new method, it was a long time before it received general acceptance. And curiously enough it was not vouchsafed to Kirstein himself to realise this. His interests were very soon diverted to the domain of art, and his further activity in the field of our speciality was lost to us.

Personally, Kirstein's communication greatly astonished me, and I freely confess that I had little belief in it. I soon, however, formed a more favourable opinion, especially after reading his first paper in the *Berliner Klinische Wochenschrift*, and seeing his demonstration before the South German Laryngological Society in Heidelberg. From that time my entire thought became bound up in the subject. It occupied me daily, and I practised the direct method in every

case where it appeared indicated. That it possessed real value was very soon obvious, materially enlarging as it did our diagnostic and therapeutic knowledge, more especially after I had succeeded in giving it a form adapted for general use. From that time the tube spatula was used almost exclusively. We penetrated by its aid into the trachea, and ultimately into the bronchi as far as the eye

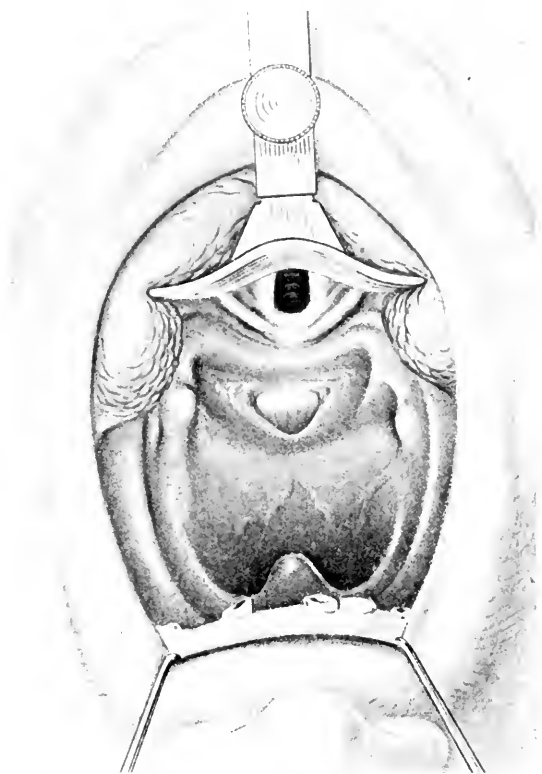


FIG. 1.—View with suspension laryngoscopy in the cadaver. Obtained with the old Kirstein's spatula. The epiglottis is hidden by the spatula. Below the epiglottis the hypopharynx and mouth of the gullet are seen.

could see. An immense field of scientific and practical activity was thus opened up, to which an unusually extensive literature bears witness.

It seemed hardly possible that anything more was wanted, and I often asked myself, what further? I had forgotten the occasions when, during operation, I felt that better access to the larynx than through a narrow tube was much to be desired.

This wish was to be fulfilled. In order to obtain, for a larger treatise, exact pictures of the deeper air-passages I got my artist, in the winter 1909-10, to work from the cadaver, as time is usually

too short to sketch and paint from examination in the living. We made use of the dissecting-room of the Freiburg Anatomical Institute for the purpose. With the head of the subject hanging over the table and the mouth wide open, a spatula was introduced over the tongue and larynx, and the field of view illuminated by an electric hand-lamp. It was too fatiguing to hold the instrument until the artist had finished, so I fastened it to an iron stand, which was screwed on to the dissecting-table. An altogether new situa-



FIG. 2.—The spatula-hook in its earliest form. Made of *one* piece.

H. Hook. Sp. Spatula.

tion, viz. the head of the cadaver suspended on the tongue spatula, was produced. By suitable manipulation, and the mouth as wide as possible, a wonderfully clear view of the whole topography of the bucco-pharyngeal cavity, of the larynx, and of the entrance of the œsophagus was obtained, and I would strongly urge trying this experiment in the cadaver. Many points will be learnt which have hitherto escaped notice. The posterior pharyngeal wall appears in its whole length and breadth, from the uvula to the mouth of the gullet. Laterally the greater cornua of the hyoid stand out. The posterior surface of the laryngeal cavity is observed in its full extent, as well as part of the posterior tracheal wall. Only the anterior wall of the larynx remains concealed.

This observation impressed me so much that it became an incentive to take up anew the improvement of direct laryngoscopy. The possibility of carrying out the same in the living came into my mind, for thus not only the upper, but also the deeper parts, of the pharynx, and especially the interior of the larynx, would be accessible to eye and hand in a manner unsuspected. The situation suggested a comparison with the work of the gynæcologist, who is able, with the speculum in position, to use both hands in operating on deep parts.

The success of the examination in the living appeared to depend upon obtaining the same relaxation of parts as in the cadaver, and this was only possible in deep anæsthesia. I determined, therefore, to undertake the first experiments on anæsthetised patients, in cases where the severity of the disease justified an anæsthetic. This limitation only increased my difficulty, for such cases were altogether too few for the development of a new method. Accordingly the simple spatula hook which I had constructed was used only in three cases—a child with laryngeal papillomata and two cases of tubercle of the larynx. The spatula and the handle for suspension of the head were made out of one piece and an excellent result was got with this instrument. The interior of the larynx was easily accessible and the operation much simplified.

Guided by this experience, further attempts were made with cocaine alone on two patients who were accustomed to the direct method. The result showed that in neither was the procedure painful. They remained perfectly still. Suspension laryngoscopy was now frequently performed, and the instruments were so altered as to be suited for general use.

This looked at first a very promising start. But it proved very soon that a long way had still to be trodden. New spatulæ and forms of hook were constructed, tested and rejected, and, to be candid, I have not at the present time arrived at the ultimate goal. Although the instruments which I commend to you to-day have done excellent service they are not yet so perfect that they cannot here and there be improved upon.

As material in respect to patients was limited in Freiburg im Breisgau, it was fortunate at this juncture that I was transferred to the larger medical centre of Berlin. In the two and half years in which I have been there, my assistants and I have been much occupied with suspension laryngoscopy and we have succeeded in improving it. I would especially mention the help given by my pupil Albrecht. Our greatest difficulty arose from the fact that

the spatula, however carefully introduced, tended to alter its position and gradually slip out of the mouth. To prevent this and to obtain an exact view of the larynx we were obliged to make the original instrument more complicated. The handle had to have in relation to the spatula an angle of adjustable size, and in addition the instrument, when well placed, had to be properly fixed. At first a mouth gag was employed, but it proved more practical to effect the opening of the mouth directly with the spatula hook.

An obstacle for a long time was inability to see the anterior commissure. This could only be overcome by pressing on the cricoid externally with the finger. To do away with this, Albrecht made use of the counterpressor invented by my former assistant, Brünings. This answered the purpose so well that it has now been suitably attached. Also a good help is my newest gutter spatula.

Experience showed that only a proportion of adults would tolerate suspension laryngoscopy under cocaine alone or with the additional help of morphine. In children it was altogether out of the question, an anæsthetic had to be given.

In the clinic at Freiburg, there has long been a certain partiality for scopolamine injections. Morphine and scopolamine are injected subcutaneously before operation to render the patient insensitive, and to a certain extent they replace ether and chloroform. The good effect of scopolamine encouraged its employment in suspension laryngoscopy. If administered in suitable doses one can dispense with chloroform and ether in adults (children should never be given scopolamine).

These are the general principles which guided the development of the method. How they have been applied in detail will be described presently.

Before doing so I should like to mention that I described suspension laryngoscopy for the first time at the International Laryngological Congress in Berlin in 1911. Since then there has been a whole series of publications. I have also demonstrated it in the Berlin Medical Society, the Society of Charité Physicians, the Laryngological Society, the Congress of the German Laryngologists at Hanover in 1912, and again last year at the International Congress here in London.

In the meantime the method had been taken up by others and favourably reported upon. It appears to have been well received on all sides. From the literature I have taken in chronological order the names, Albrecht, Hölscher, Wolff, Brieger, Pollatschek,

E. Mayer (New York), from the years 1912-13, Davis, Gerber, Kaempfer, Kahler, Kleestadt, Freudenthal, Storath, Lautenschläger, Hopmann, Katzenstein, Mann, Froning, Iglauer, Steiner, Howarth, Chiari, A. Seiffert (Breslau), Henrich, Simoleki, Yankauer, Details are given in the bibliography. The papers of Albrecht and of Seiffert are especially worth perusal.

II. INSTRUMENTS FOR SUSPENSION LARYNGOSCOPY.

The Tongue Spatula.

Attention was mainly directed to the tongue spatula and to its handle with the hook-shaped extremity. Since the discovery

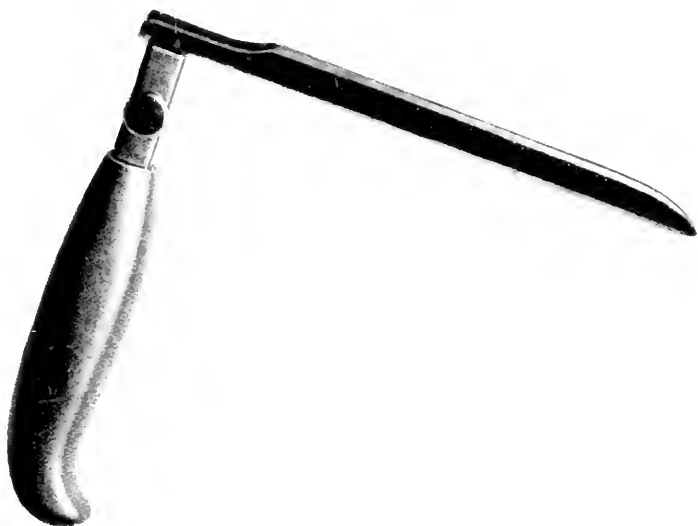


FIG. 3.—The gutter-spatula.

of direct laryngoscopy, tongue spatulae of various forms have been constructed. Personally, I had worked with the tube spatula although I had always made use of the simple long narrow Kirstein's spatula as well. Later I suggested, instead of a complete tube, a split one in the form of a gutter having on cross section the form of a Roman V. Very firm pressure can be exerted by it on the middle of the tongue, and I have employed it in a somewhat modified form for suspension laryngoscopy from the commencement. Later it seemed to me I might get better results from a simple narrow spatula, the anterior end of which was heart-shaped. But more recently, having succeeded in materially improving the gutter spatula, I have come back to it.

It is essential to prevent the tongue bulging too much to the right or left at the side of the spatula and overlapping the gutter. Movable flanges have, therefore, been fitted to its sides. The

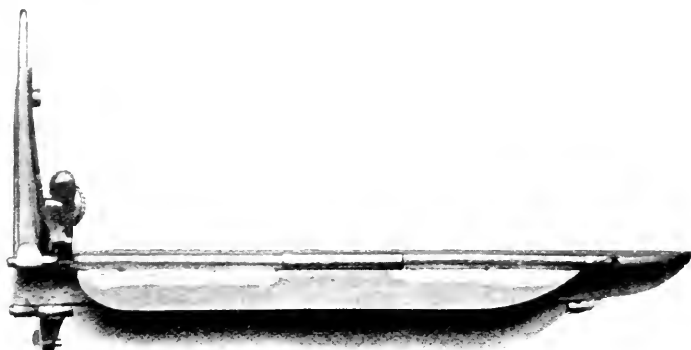


FIG. 4.—The flanged gutter-spatula. Both flanges are adjustable.

flanges may, by means of levers, be made to assume and retain the desired position. Such a spatula leaves little to be desired in the way of adaptability, and one ought, of course, to have it of different lengths.

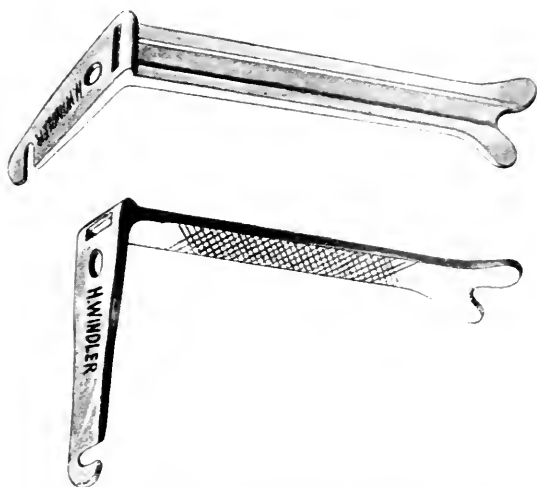


FIG. 5.—Double spatula without epiglottis elevator. Anterior end heart-shaped, behind is a slot through which the epiglottis elevator is inserted.

A second form has also proved of service. Not infrequently it happens that even a well-fixed epiglottis gradually slips from under the spatula and readjustment of the instrument becomes necessary. The epiglottis may be raised easily by means of a small rod, and

Albrecht has had a spatula made which can be extended whilst in position. Carrying out this idea, I have attached to the tongue spatula a second narrower and longer one which is inserted through a slot and can be fixed by means of a screw. This arrangement enables the epiglottis to be very easily raised. The introduction of the instrument enables in the first instance the tongue up to the epiglottis to be controlled, and, in the second place, the epiglottis

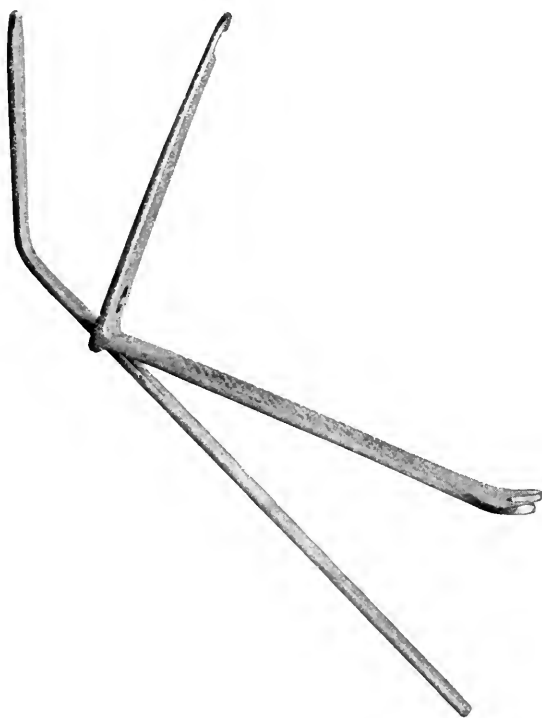


FIG. 6.—Double spatula with epiglottis elevator.

to be brought out of the field of vision. Both procedures are of practical value.

As spatulae of different lengths are in use provision must be made to detach them from the suspension hook when necessary. The shaft of the tongue spatula is, therefore, constructed to permit this adjustment.

The Suspension Hook.

The tongue spatula had, as already mentioned, only a straight rod as handle, the end of which was curved in the form of a hook. A joint was then introduced in the course of the rod, but, later,

I thought this might be dispensed with. Albrecht, however, showed that slipping out of the tongue spatula might be prevented

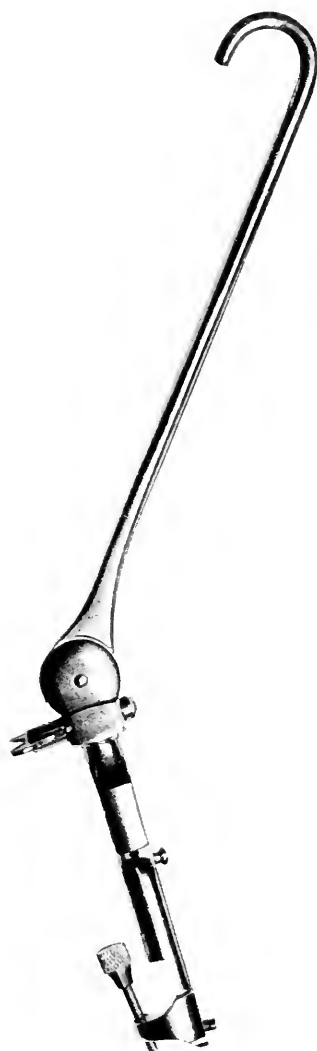


FIG. 7.—The suspension-hook by itself. Joint adjustable by thumb-screw. At the lower end screw for fixing epiglottis elevator. Behind, two pins for attachment of tongue spatula.

by making the point of suspension fall perpendicularly over the end of the tongue spatula or even in front of it, so that it appeared desirable again to provide the suspension-hook with a joint which could be adjustable. This is carried out by means of a thumb-

screw and a mechanism in which the principle of the worm-screw is adopted. On turning the thumb-screw in the direction of the

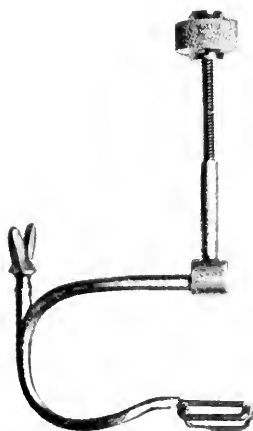


FIG. 8.—The mouth gag. Detached from suspension hook. Lower part of the gag turns on vertical axis and fixed by screw.



FIG. 9.—The suspension-hook with mouth gag.

hands of a watch, the hook is inclined towards the tongue spatula and a clearer view of the larynx is rendered possible.

To the part of the suspension-hook below the joint the tongue spatula is attached. It has also a particular arrangement. There

is a large screw which comes into play in opening the mouth. The second screw, on its anterior aspect, serves to fix the epiglottis-spatula.

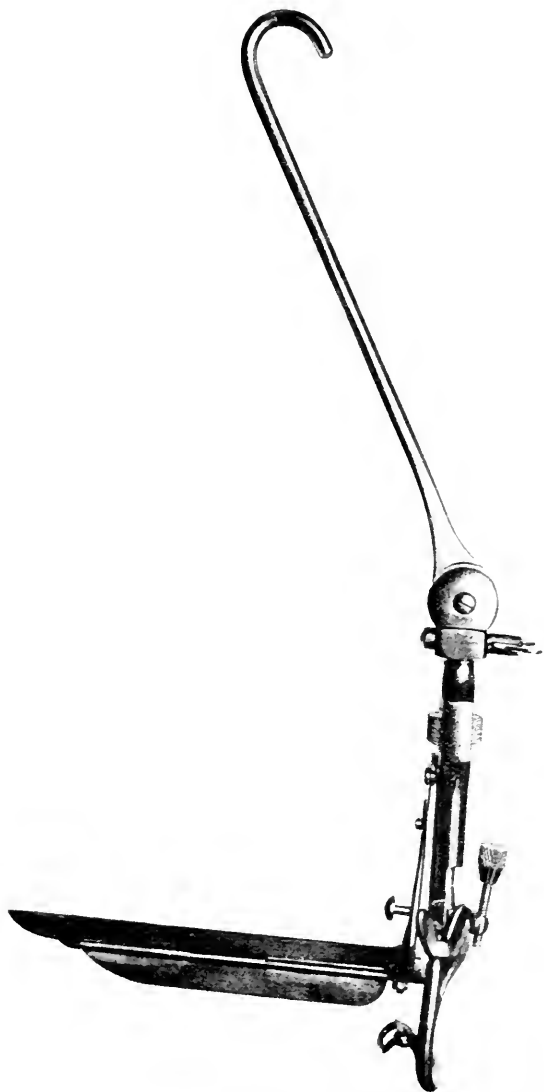


FIG. 10.—The suspension-hook with mouth gag and flanged gutter-spatula. seen from the side.

The Mouth Gag.

As the mouth of the patient must be held continuously open as wide as possible, a gag is absolutely necessary. This has the form

of a bow, which is fitted to the lower part of the spatula hook, and can be screwed up and down. The bow impinges by means of a small stop against the incisor teeth, or in an edentulous mouth against the upper edge of the alveolar process. Instead of the stop an adjustable plate can be made use of. Recently the bow itself has been made adjustable in a horizontal direction as well, so that it can be better adapted to the particular circumstances of the patient.



FIG. 11.—The counter-pressor. Closed.

The Counter-pressor.

The counter-pressor is intended to exert pressure on the cricoid region of the larynx and to push it towards the tongue spatula. It is, therefore, also fixed to the spatula hook. I have had it made in the form of a circle, and so arranged the curve that it can be lengthened or shortened. It can be likewise raised up. It presses upon the larynx by means of a plate.

The Gallows.

It is necessary to suspend the spatula hook, and the point of suspension must be in the position which the hook assumes after the introduction of the spatula. Special apparatus is, therefore, necessary to carry out rapidly and with ease all forms of adjustment, higher, lower, backwards, forwards. This apparatus, which

I have called the gallows, is screwed to the operating table. It consists essentially of an upright carrying a horizontal arm.



FIG. 12.—The counter-pressor. Extended. Anteriorly the plate which is placed on the cricoid cartilage. At the other end the attachment-mechanism and joint.

The upright is attached to the extreme corner of the top of the operating table. It can be placed higher or lower, and by means of a crank-handle to move backwards or forwards. From the upright projects a horizontal arm, which reaches to the middle of the operating table, and can itself be fixed higher or lower. The

adjustment of the upright gives the rough, that of the horizontal arm the more detailed, view.

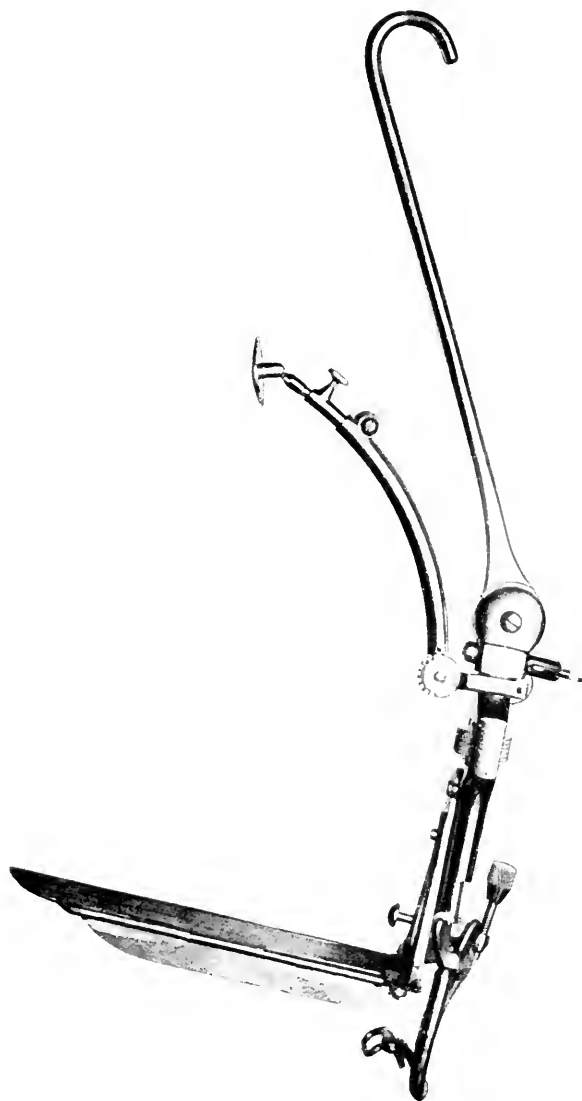


FIG. 13.—The suspension-hook with spatula and counter-pressor. Counter-pressor raised up.

The Operating Table.

Most operating tables are so constructed that the gallows can be attached. It was clear, however, that for suspension laryngo-

scopy they might be materially improved upon. The requirements are similar to those for the direct method on patients, in the back or side position.

The first desideratum is to be able to make the top of the table higher or lower. With the ordinary table the operator is usually

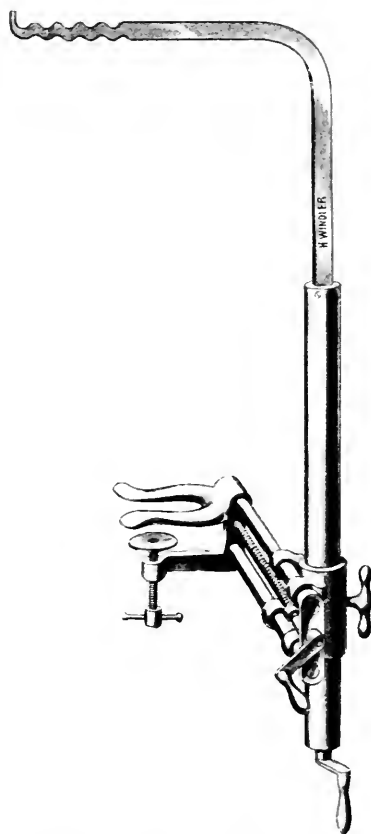


FIG. 14.—The gallows with mechanism for attachment to the operating table.

obliged to squat upon a stool or even to kneel. I have often had to carry out most difficult manipulations in cramped positions, which made it extremely fatiguing and prejudicial to success. Ordinary operating tables can be raised but little. They do not, as a rule, allow of the operator sitting upon a chair or standing, which is very convenient for demonstration. Kahler has had a special stool constructed, which may be screwed up as high as is necessary. I have had a new table so arranged that it can be raised unusually high. This is done by means of a crank-handle

manipulated by the operator himself. The top of the table can also be lowered and the back-rest adjusted. For the head a support adjusted by a handle has lately been introduced, so that the help of an assistant to hold the head is no longer necessary.

All operations usually performed by laryngologists may be done on this table, and in this respect it is not inferior to others.

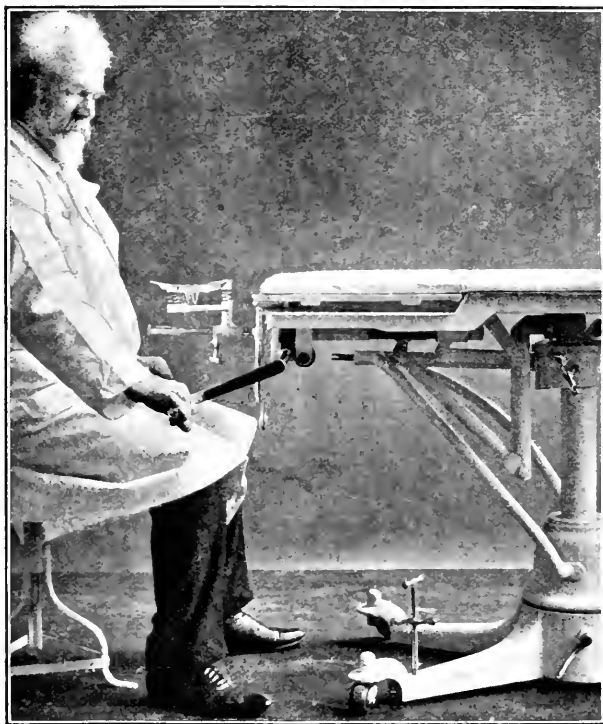


FIG. 15.—Operating table lowered. I am holding the crank-handle which regulates the table top.

Other Instruments.

For the protection of the operator from expectoration, especially in tuberculosis, a sheet of glass has been fixed to the gallows, so as to come between the surgeon and the patient. Single and double curettes of suitable form and length are necessary for various operative procedures, and so also are galvanocautery points for deep puncture. For hæmorrhage, instruments are made by the firm of Fischer, which permit the fastening and removal of clips in a manner similar to those used for uniting skin wounds or

controlling tonsil bleeding. Blumenfeld first recommended the use of such clips in the larynx.

III. ILLUMINATION.

In using instruments in suspension laryngoscopy, good illumination is, of course, required. It is possible, with a head-mirror and

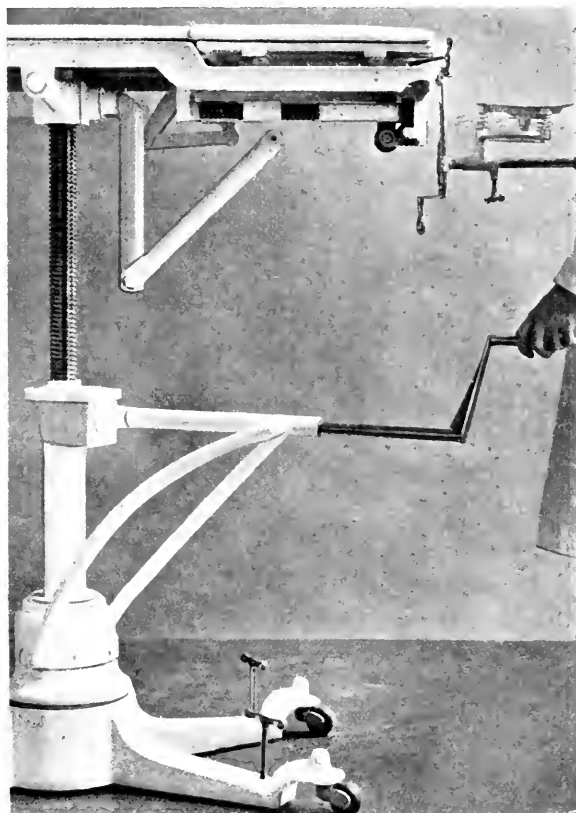


FIG. 16.—Operating table in raised position, by turning crank-handle.

a good lamp fixed to a stand or held by an assistant, to obtain sufficient light. The Nernst lamp, with the light concentrated by a lens, is quite suitable.

Personally I have always found very convenient the old Kirstein head-lamp, used as in other operations. Its drawback has always been that it is not aseptic in its construction. For this reason I have lately had made, by the firm of Wolff, an aseptic head-lamp, with a number of innovations. There is a

new form of joint which greatly facilitates focussing. The electric lamp has three crossed metallic filament-spirals giving a very strong light. The focussing lens can be adjusted by means of a screw. There is also an iris diaphragm to make the light circle larger or smaller. Its adaptability for demonstration purposes is not lost sight of.

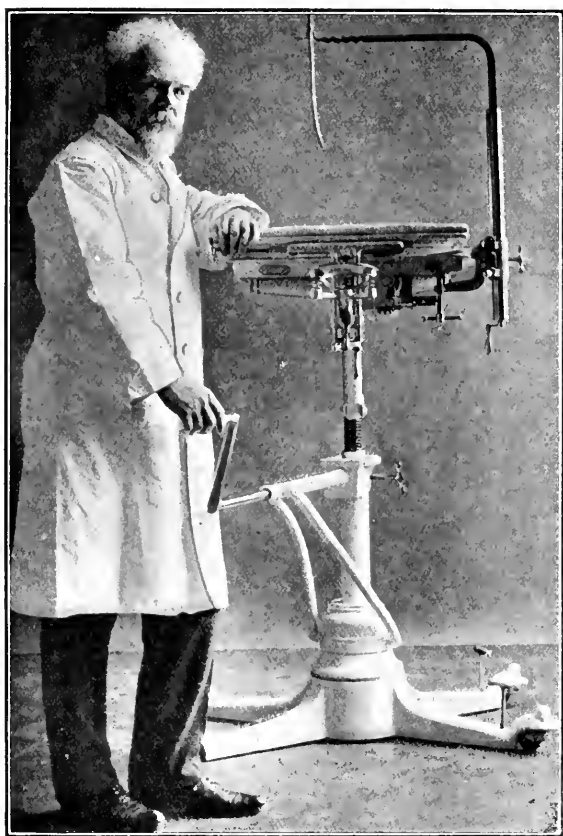


FIG. 17.—Operating table, head aspect. Table raised, gallows clamped on.

Quite new is the employment of a transformer suspended from the roof of the operating theatre. The rheostat swings by a cable free over the operating-table so that the flexible no longer drags on the floor, and, being covered with rubber tubing, it can be washed. The head-lamp and the rheostat are balanced by counterpoise, and one can work comfortably with the lamp on the head without the flexible dragging. The new installation has proved a success.

For demonstration purposes it is of advantage to have illumination by means of small electric lamps fastened either to the suspension hook itself or to its bow outside. Very effective is the method of having miniature lamps fixed on the end of the tongue spatula by a special apparatus. As may be gathered there are

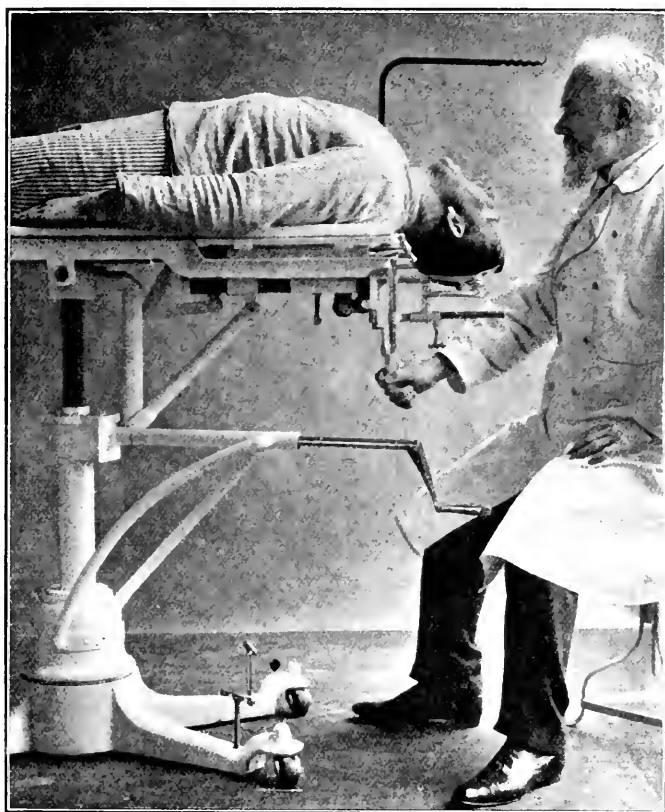


FIG. 18.—Operating table. To demonstrate the head support.

many ways of obtaining good illumination. Each operator can proceed according to his liking and to the purpose he has in view.

IV. PREPARATION OF THE PATIENT FOR SUSPENSION LARYNGOSCOPY.

All patients are not suitable for carrying out this procedure. Those who place difficulties in the way of introduction of tubes conduct themselves in a similar manner in suspension laryngo-

scopy. I refer to patients who do not open the mouth well, in whom the teeth in the upper jaw are very prominent, the tongue very thick and unyielding, and the larynx reached only with

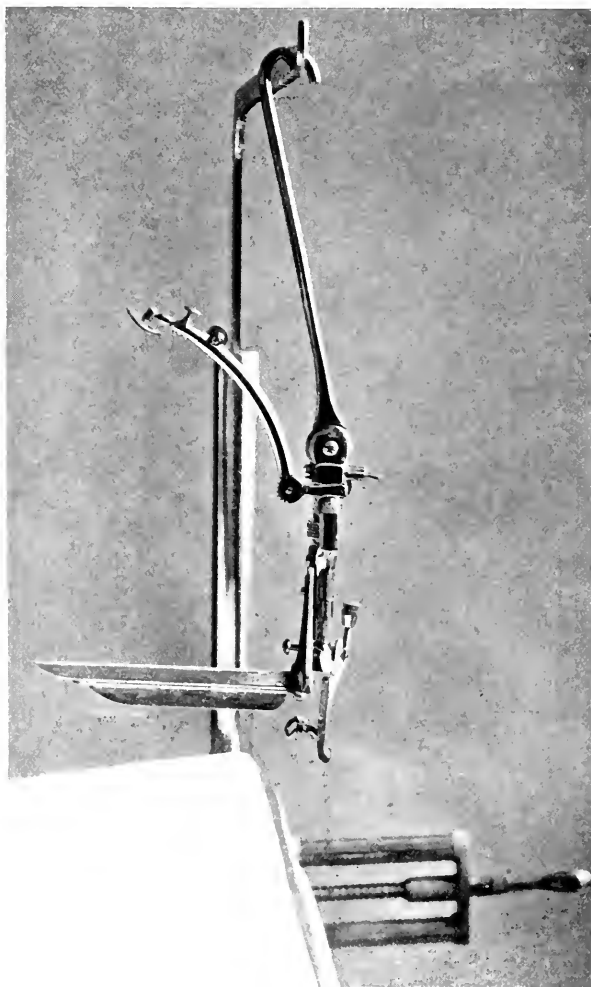


FIG. 19.—Suspension-hook with gallow on the operating table.

difficulty, by a narrow tube, from the angle of the mouth. In such circumstances it is hardly worth while to attempt the new method.

Before the patient is submitted to suspension laryngoscopy one ought to satisfy oneself as to his behavior under direct examination. As a rule I introduce beforehand, with the patient sitting

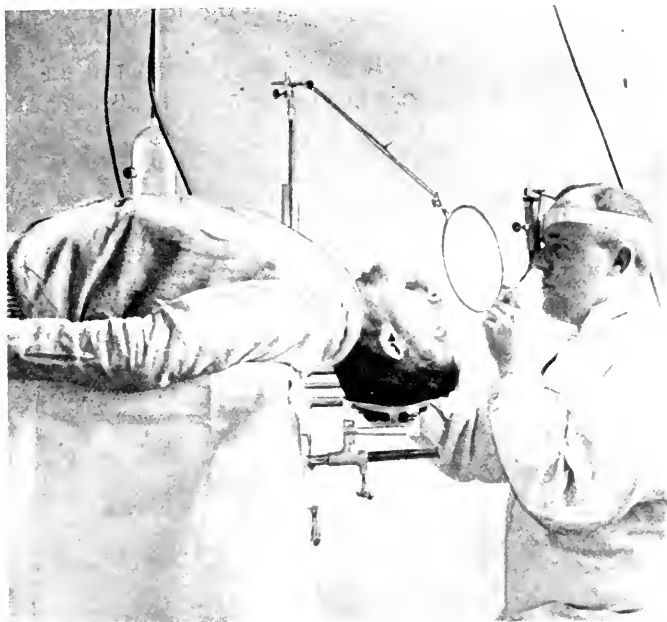


FIG. 20.—Glass protector on gallows.

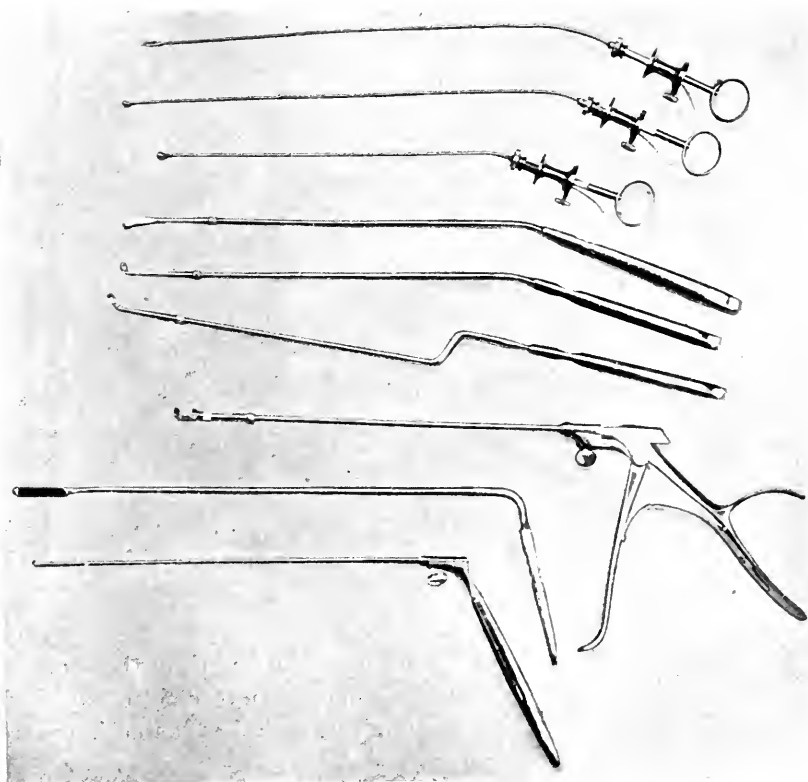


FIG. 21.—Operating instruments.

and under reflected light, a long tongue spatula, and find out how much the base of the tongue can be depressed. At the same time

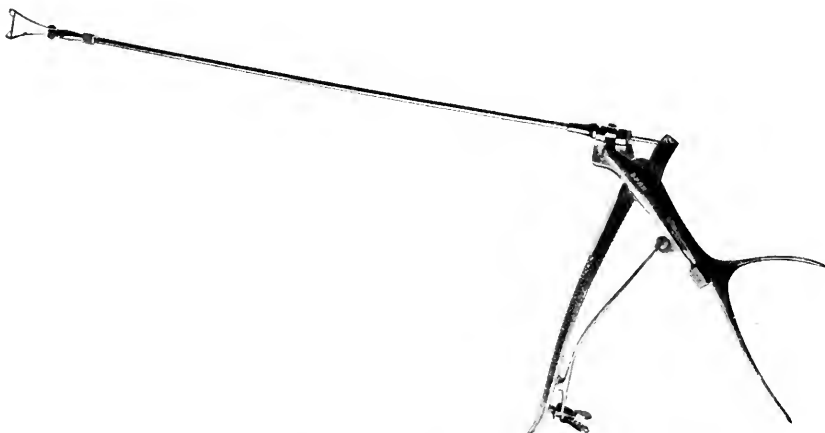


FIG. 22.—Fischer's clip-holder.



FIG. 23.—Wolff's head-lamp with rheostat.

this examination is utilised to determine the length of the spatula to be used in suspension laryngoscopy. In order to do this accurately Kahler has had Kirstein's spatula graduated in order

to measure the distance from the lower incisors to the base of the epiglottis. This is of great advantage.

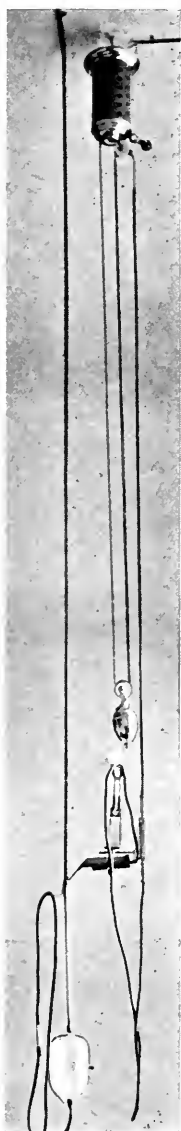


FIG. 24.—Transformer with head-lamp. The transformer is fixed to the ceiling of the operating theatre. Close by it, suction-tube with glass reservoir.

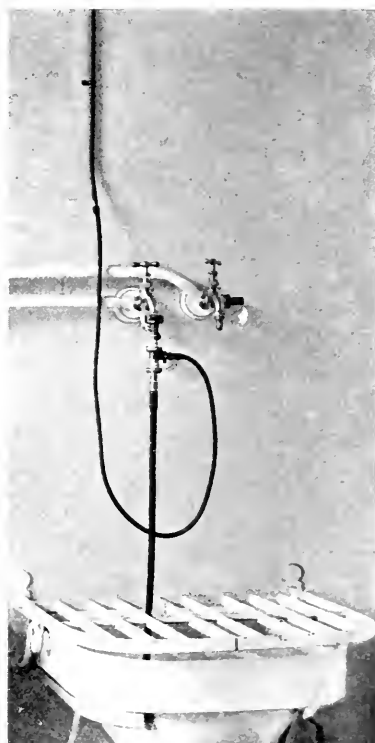


FIG. 25.—Water-suction air-pump. The tubing runs from the wash basin to the ceiling, and thence to the operating table.

In children this preliminary examination is unnecessary. In our experience suspension laryngoscopy can be carried out on them with ease. Women also in general stand it well.

The examination is best carried out in the morning with the patient fasting. If the cases are snitable and the patients not apprehensive, endeavour is made to carry it out under cocaine alone. For this I recommend especially the 25 per cent. spirit solution. It is applied to the mucous membrane of the base of the tongue, pharynx and larynx after previous application of the 20 per cent. aqueous solution. The addition of adrenalin is always helpful.



FIG. 26.—Miniature lamp for attaching to gag.

Children should be put under the influence of chloroform or ether. We begin with a mask and then change to a bellows apparatus, the form devised by Braun being preferred. It is absolutely necessary during and after the introduction of the spatula hook to blow the anæsthetic under increased pressure, into the deeper air-passages, otherwise with the mouth widely open too little is carried into the lungs and no regular and sufficiently deep anæsthesia is obtained. It is a good plan to give half an hour beforehand according to the age 5 to 10 drops of a 1 per cent. codeine solution in order to lessen cough reflex.

(To be continued.)

THE RHINOGENIC AND OTOGENIC LESIONS OF THE THIRD, FOURTH, FIFTH AND SIXTH CRANIAL NERVES.¹

BY LADISLAUS ONODI (Budapest).

Translated by DAN McKENZIE.

(Continued from p. 311.)

We add to these, more recent figures which show in an instructive fashion the relationship of the sphenoidal sinus and of the posterior ethmoidal cells to the foramen rotundum and to the superior orbital fissure. Fig. 6 shows in a frontal section of a skull the relationship of the right sphenoidal sinus to the foramen

¹ Paper read and preparations shown at the Annual Meeting of the Belgian Society of Otology, Rhinology and Laryngology. Brussels, July, 1913.

rotundum, which transmits the second division of the trigeminus, and also its relationship to the superior orbital fissure through which the orbital nerves pass. The bony partition common to

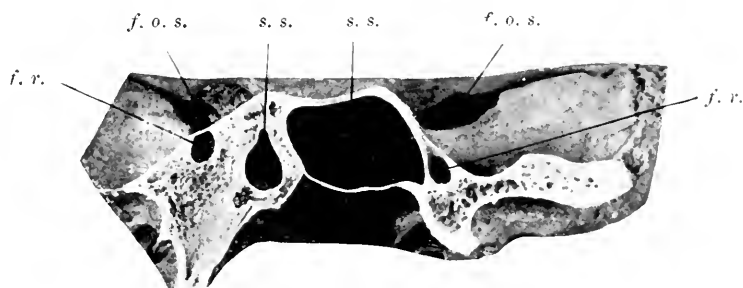


FIG. 6.—Natural size. Frontal section. Both sphenoidal sinuses opened. *s. s. d.* Right sphenoidal sinus. *f. r.* Foramen rotundum. *f. o. s.* Superior orbital fissure. *s. s. s.* Left sphenoidal sinus.

sphenoidal sinus, foramen rotundum, and superior orbital fissure is extraordinarily thin and translucent. The left sphenoidal sinus has absolutely no relationship with this region.

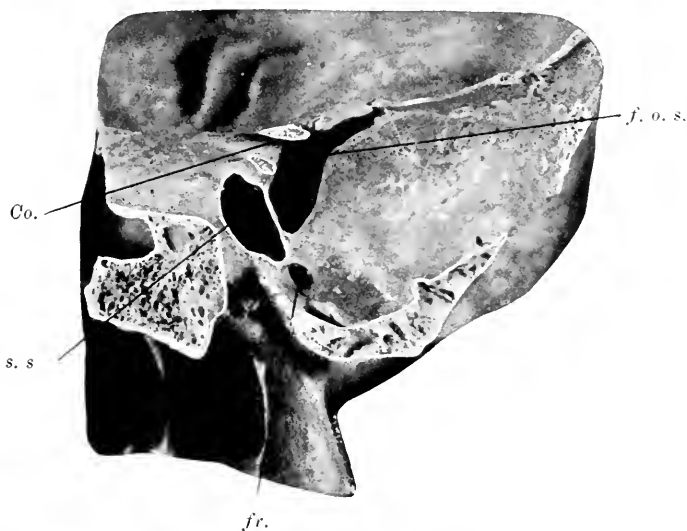


FIG. 7.—Natural size. *s. s. d.* Right sphenoidal sinus. *f. r.* Foramen rotundum. *f. o. s.* Superior orbital fissure. *Co.* Optic foramen.

Fig. 7 illustrates in a frontal section of a skull the relationship of the right sphenoidal sinus to the foramen rotundum and to the superior orbital fissure. The oculo-orbital nerves are in direct contact in their course to the orbit with an extremely thin bony wall.

Fig. 8 illustrates in a frontal section on both sides the close relationship of the posterior sphenoidal sinus to the foramen rotundum and to the superior orbital fissure, with which the thin osseous wall of the posterior ethmoidal cells is in direct contact, and in this way comes into closer connection with the nerve-trunks passing to the orbit.

In a bone specimen I observed the close relationship of the sphenoidal sinus to the foramen ovale through which the third branch of the trigeminus passes. Fig. 9 illustrates in a bone specimen the relationship of the frontal sinus to the superior orbital fissure where the oculo-orbital nerves enter the orbit.

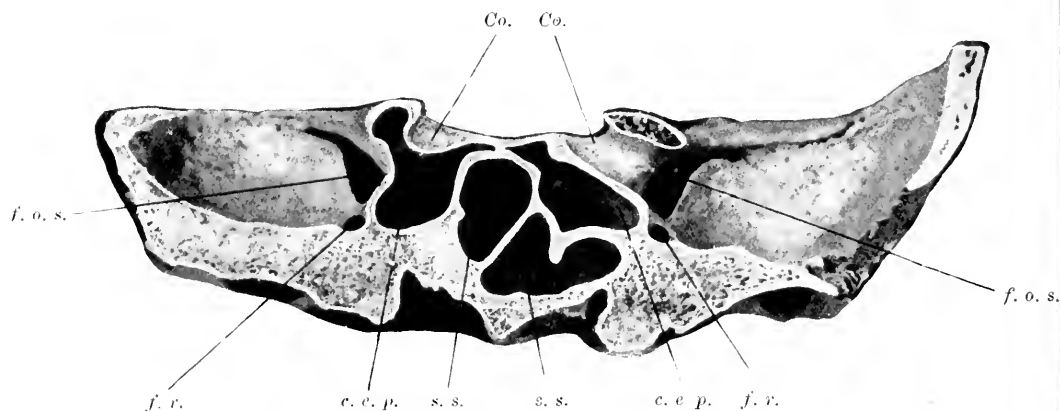


FIG. 8.—Frontal section. Natural size. *s. s. d.* Right sphenoidal sinus. *s. s. s.* Left sphenoidal sinus. *c. e. p. d.* Right posterior ethmoidal cell. *c. e. p. s.* Left posterior ethmoidal cell. *f. r.* Foramen rotundum. *f. o. s.* Superior orbital fissure. *Co.* Optic foramen.

Together with that I found in forty specimens preserved in alcohol and formalin a close relationship (the bony wall being thin and translucent) between the sphenoidal sinus and the nerve-trunks as follows: between the sphenoidal sinus and the oculo-motor twice; between the sphenoidal sinus and the trochlearis, twice; between the sphenoidal sinus and the first division of the trigeminus, ten times; between the sphenoidal sinus and the second division of the trigeminus, seven times; between the sphenoidal sinus and the abducens, eight times. The relationship was homolateral in all save one in which it was contra-lateral. These refer to twelve specimens in which, as a rule, several nerve-trunks showed homolateral and only once several nerve-trunks showed contra-lateral relations. Among eleven bone specimens I found intimate relations between the sphenoidal sinus and the superior orbital fissure three

times; between the posterior ethmoidal cells and the superior orbital fissure, twice; between the sphenoidal sinus and the foramen rotundum, three times; between the posterior ethmoidal cells and the foramen rotundum, twice; between the sphenoidal sinus and

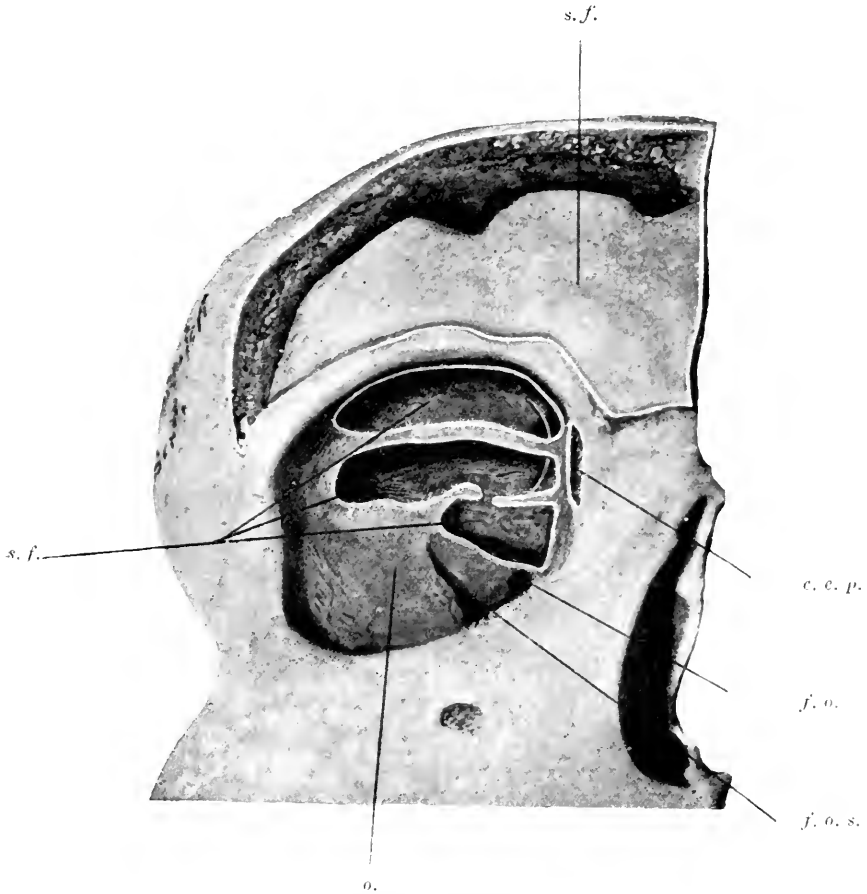


Fig. 9.—Natural size. Relationship of the frontal sinus to the superior orbital fissure and to the optic foramen. *s. f.* Frontal sinus. *c. e. p.* Posterior ethmoidal cell. *o.* Orbita. *f. o.* Optic foramen. *f. o. s.* Superior orbital fissure.

the foramen ovale, once; between the frontal sinus and the superior orbital fissure, once; between the sphenoidal sinus and the Vidian canal, once. These refer to six specimens.

Fig. 10 illustrates the relationship of the sphenoidal sinus to the Vidian canal, in which the Vidian nerve runs, standing in connection with the two ganglions of the trigeminus, the sphenopalatine

ganglion and the otic ganglion. The thin superior protruding wall of the Vidian canal running in the floor of the sphenoidal sinus is removed and the position and course of the Vidian canal in the inferior wall of the sphenoidal sinus is well shown.

Thus a bony wall which is thin to the point of translucency and is in contact with the trunks of the oculo-orbital nerves must predispose when the posterior accessory sinuses are diseased to the extension of the disease-process, to infection by contact, and to the

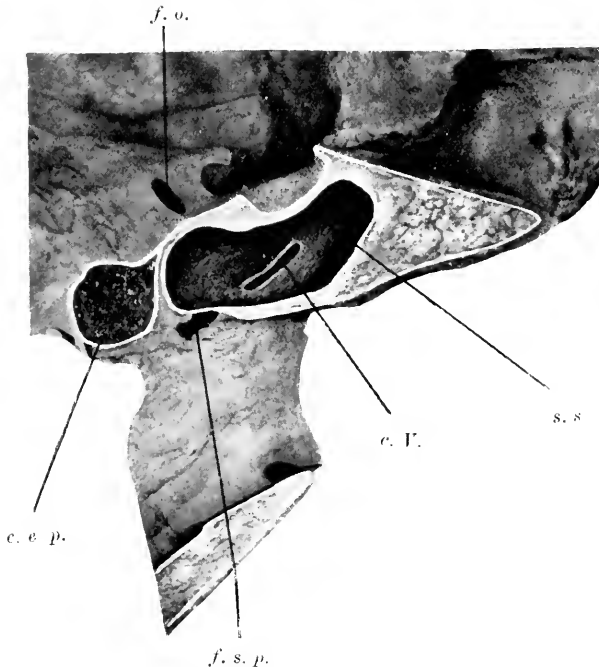


FIG. 10.—Natural size. Relationship of the Vidian canal to the sphenoidal sinus. *s. s.* Sphenoidal sinus. *c. V.* Vidian canal. *c. e. p.* Posterior ethmoidal cell. *f. o.* Optic foramen. *f. s. p.* Foramen sphenopalatinum.

formation of lesions in these nerves, while on the other hand, thickness and density in the structure of the party-walls and of the bony layers of these sinuses may be regarded as a protective factor, hindering the extension of the pathological process. In our researches we came across many preparations in which the sphenoidal sinuses showed absolutely no relationship with the trunks of the oculo-motor, the trochlearis, the trigeminus and the abducens. Further we have seen preparations in which the sphenoidal sinus was separated from the clivus by a layer of bone from 6 to 16 mm. thick. As a further explanation of the rarity of rhinogenic lesions

of the oculo-orbital nerves we may refer to the view of Fuchs who held that the frequent immunity of the fibres going to the intrinsic muscles in peripheral processes is referable to the slight vulnerability of these fibres, wherein they contrast with the high vulnerability of the papillo-macular bundle of the optic nerve.

In the production of lesions of the oculo-orbital nerves we have still to consider tumours, traumatism and fractures of bone. It is evident that tumours either of the posterior accessory sinuses or of the adjoining parts—the region of the oculo-orbital nerves in the posterior and middle cranial fossæ, the body of the sphenoid, the cavernous sinus and the foramina of exit of these nerves—the superior orbital fissure, the foramen rotundum and the foramen ovale—may reach, surround, compress, destroy and paralyse these nerves. In like manner, traumata and gunshot wounds from without or from the nasal cavity may injure the posterior accessory sinuses and the nerves in their neighbourhood and cause breaches of continuity in the nerve trunks. With regard to fracture in the vicinity of the oculo-orbital nerves, the structure of the cerebral wall of the accessory sinus plays a rôle, since a thin wall favours and a thick dense bony wall hinders or prevents the fracture.

We have already mentioned direct and indirect infection through the vascular channels which is in sympathy with the region of the route of the oculo-orbital nerves and their trunks.

Lastly, there may be mentioned the harmful influence upon the nerve fibres of the oculo-orbital nerves, which results from the toxins produced in purulent collections and in tumours.

With reference to otogenic lesions of the oculo-orbital nerves it is, for the most part, indirect sequelæ that have been observed. The indirect otogenic lesions of the eye nerves may develop in the relations mentioned through the agency of the temporal bone and of the vascular channels in consequence of inflammations of the membranes of the brain, and of the venous sinuses of the skull. The facial in the Fallopiian canal is the only nerve in direct relationship with the organ of hearing, and indeed it is the geniculate ganglion which is connected with the secretory innervation. Goldzieher (30) demonstrated that in cases of facial paralysis the lacrymal secretion may cease. Köster (31) and others have shown that the disturbance of the lacrymal secretion is connected with the lesion of the secretory nerve fibres which leave the trunk of the facial by way of the geniculate ganglion and pass with the great superficial petrosal nerve to the spheno-palatine ganglion, whence they reach the lacrymal gland through the intermediary of

the second or first division of the fifth. Arloing, Laffay and Römer (32) believe that the sympathetic also supplies secretory inhibitory fibres to the lacrymal gland by way of the blood-vessels. The region of the geniculate ganglion may be directly involved by disease processes in the hearing organ and may lead to secretory disturbance in the lacrymal gland. The same disturbances may also be induced by intra-cranial processes affecting the trunk of the facial at its entrance into the petrous bone, while lesions of the nucleus of the facial in the medulla leave undisturbed the lacrymal secretion, which therefore may be referred to another origin, probably to the glosso-pharyngeal.

The extension of the inflammatory process to the petrous pyramid and to the venous sinuses, together with the primary disease in the temporal bone when it extends as far as the apex of the petrous, may affect the nerves to the eye. This extension of the purulent otitis media has been observed by Tröltsch, Ostmann, and Hilgermann (33). The situation of the Gasserian ganglion in the trigeminal impression near the apex of the petrous, to which we have already alluded, explains the facility of lesions of the trigeminus in direct or indirect diseases of the petrous bone. Thus Scotti observed destruction of the left Gasserian ganglion through necrotic disease of the pyramid after separation and extension of a sequestrum from the auditory meatus. Bircher (35) observed in phlebitis of the lateral, inferior, petrosal and cavernous sinuses in which the pus had penetrated to the apex of the petrous pyramid, paralysis of the oculo-motor and irritation of the trigeminus which disappeared after operative treatment. Hilgermann saw the Gasserian ganglion affected in two cases of cavernous sinus (? thrombosis). Jansen and others observed lesions of the oculo-motor, trochlearis, trigeminus and abducens in phlebitis and thrombosis of the cranial venous sinuses. In the case of Noltenius (37), with paralysis of the abducens, the autopsy showed a necrotic area in the petrous bone. Sikkel (38) observed trigeminus neuralgia in consequence of irritation of the Gasserian ganglion in otitis media. Sargnon (16) reports total paralysis of the oculo-motor in two cases with brain symptoms with caries of the temporal bone and disease of the outer wall of the cavernous sinus. Lapersonne (16) observed paralysis of the trochlearis in otitis. In purulent otorrhœa, Wadsworth (39), Michel (40) and others observed periodical recurrent paralysis of the oculo-motor. In Michel's case the periodic oculo-motor paralysis disappeared as soon as a large collection of pus had discharged. Wadsworth explains this

clinical appearance as due to an inflammatory change of the dura mater in the region of the oculo-motor. Eversbusch (41) considers it doubtful whether we are here dealing with an otogenic neuritic change or with a toxic inflammation. In addition to the extension of the inflammatory process a purely toxic effect upon the nerve-fibres cannot be shown at present. Chierici also saw in purulent otitis media a recurrent paralysis of the abducens, which promptly disappeared when the purulent discharge was facilitated and reappeared twice again.

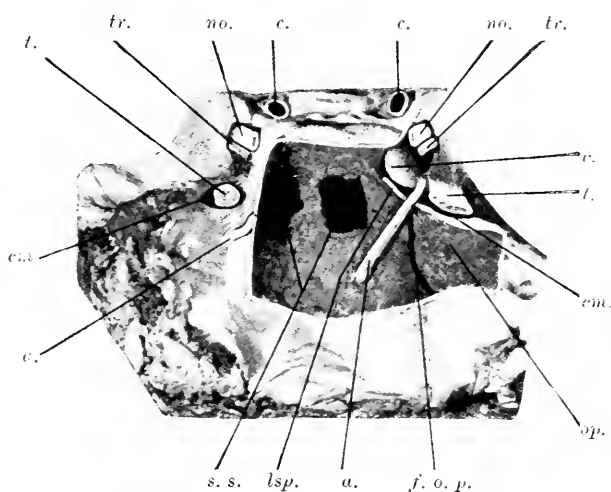


FIG. 11.—Natural size. *s. s.* Sphenoidal sinus. *a.* Abducens nerve. *t.* Trigemini. *cm.* Meckel's cave. *tr.* Trochlearis. *no.* Oculo-motor nerve. *c.* Internal carotid. *lsp.* Petro-sphenoidal ligament. *f. o. p.* Petro-occipital fissure. *op.* Petrous bone.

Dorello (43) and Baldenweck (44) have sought to refer the indirect otogenic lesion of the abducens to anatomical conditions. Dorello mentions the direct relationship between the veins of the tympanic cavity and of the inferior petrosal sinus, and Baldenweck refers to the congenital dehiscences in the bone of the anterior wall of the tympanic cavity. He describes the close relationship of the nerve-trunk to the apex of the pyramid, the abducens being attached to it by a firm disc of connective tissue, which is further strengthened by the petro-sphenoidal ligament and by processes of dura. Immediately after its transit across the edge of the pyramid the abducens sinks into the cavernous sinus. Dorello describes a narrow cleft in which the abducens runs along with the inferior petrosal sinus; disease-processes can easily narrow this cleft and compress the nerve-trunk.

My anatomical researches have given the same results, and I show in Fig. 11 the close relations of the sixth nerve to the apex of the petrous bone, to the petro-sphenoidal ligament and to the dura mater. In the specimen the dura mater is partly separated from the clivus and from the posterior surface of the petrous bone. The occipito-petrous fissure with the inferior petrous sinus coursing through it, can be seen, together with the entrance of the trigeminus into the cave of Meckel, the entrance of the abducens into the cavernous sinus and the trunks of the oculo-orbital nerves.

Clinical examinations have shown oto-ocular reflexes, and, in purulent inflammation of the middle-ear, abducens paralysis has been interpreted as a reflex nuclear paralysis by way of the vestibular nerve (*sic.*). Verdos (45), for example, observed disturbances of hearing and diplopia, which disappeared after the removal of a plug of cerumen; Chimansky (46) found abducens paralysis in diffuse external otitis; Gellé (47) saw mydriasis after the removal of a polypus of the tympanic cavity, and Bonnier (48) found, after syringing out a plug of cerumen, disturbances of vision of some hours' duration.

In purulent inflammation of the middle ear, paralyses of the abducens have been repeatedly observed, sometimes of a persistent character. Thus Krepuska, among others, noticed a persistent otogenic paralysis of the abducens, which did not disappear after the middle-ear suppuration had been cured by operation. Perkins (49) has reported a hundred cases, in one fourth of which the abducens paralysis appeared as a post-operative phenomenon, and in half of the cases the Gasserian ganglion was involved. Gradenigo (50) considered the symptom-complex of purulent otitis media with unilateral fronto-parietal headache and abducens paralysis as a characteristic pathological picture, and explained the lesion of the Gasserian ganglion and of the abducens as an extension of the inflammatory process to the apex of the petrous bone by way of the circum-tubal pneumatic spaces and of the carotid canal—that is to say, as an osteitis of the apex of the petrous bone and a circumscribed meningitis corresponding to it.

Alt (51) recognises the following varieties of otogenic abducens paralysis, based upon an aetiological basis:

- (1) Reflex paralysis by the route of the vestibular nerve.
- (2) Paralysis depending upon infective neuritis.
- (3) Extension of the purulent inflammation from the middle ear in the venous channels of the carotic canal to the cavernous sinus.

(4) Deep-seated disease of the petrous bone at the apex with localised meningitis.

(5) Otogenic diffuse meningitis.

(6) Extra-dural abscess.

Most of the authors regard circumscribed meningitis of the apex of the petrous pyramid as the most common cause of otitic paralysis of the sixth nerve. Some writers, such as Tommasie (52), Gerouzi (53), Baldenweck (54), Lannois and Perretière (55), refer it to a toxic neuritis. When labyrinth symptoms are present the idea of a reflex paralysis is accepted. Thus Neumann (56) holds that even a trifling irritation of the labyrinth may evoke disturbances of the eye-muscles, for the vestibular apparatus is the centripetal limb of a reflex arc, the centrifugal limb of which is formed by an eye muscle. Extra-dural and peri-sinus abscesses exercising pressure upon the abducens have also been demonstrated. In the few autopsies disease of the petrous pyramid has been shown to exist.

In the cases of otitic abducens paralysis which have been published the paralysis was one-sided and homolateral; in one or two cases, however, contra-lateral paralysis was observed. Mounier (57), for example, found bilateral paralysis in a unilateral otitis; Furet (58) observed a right-sided abducens paralysis in left-sided otitis; Collinet (59) and Quadri (60) also saw contra-lateral paralysis. The aetiology of this contra-lateral abducens paralysis has not been explained.

Finally, there remain to be mentioned otogenic nystagmus and otogenic differences in the pupils. Gradenigo (61), in lesions of the labyrinth and in intra-cranial complications, refers the nystagmus to irritation of the semi-circular canals and changes in the superior cerebellar peduncle, and he ascribes the difference in the pupils to labyrinth suppuration and to latent circumscribed meningitis.

The raised pressure in otogenic meningitis and brain abscess also plays a part in the aetiology. In a case reported by Brieger (62) the raised pressure in an otogenic serous meningitis induced a paralysis of the sixth nerve, which disappeared after lumbar puncture. In addition to a rise in pressure, toxic influences may occur in brain abscess, and according to Körner (63) also in serous meningitis. Thus in otogenic temporo-sphenoidal abscess and in cerebellar abscess paralysis of the oculo-motor and of the abducens have been observed. Lombard (64) believes that in purulent otitis media, with signs of intra-cranial abscess, oculo-motor paralysis denotes

cerebral abscess, and that abducens paralysis denotes cerebellar abscess. Barker and Röpke (65) observed trigeminal neuralgia in otogenic temporo-sphenoidal abscess due to pressure upon the Gasserian ganglion.

It is well known that the nerve-trunks may be injured in tuberculous and gummatous processes in the temporal bone and in the base of the cranium. New growths in the sphenoidal bone, in the petrous bone, in the base of the skull, and in the brain may lead to sympathetic involvement of the oculo-orbital and other nerves according to their extent. Further, various traumatic influences—fractures of the base and gunshot wounds—have induced lesions and breaches of continuity of the nerve-trunks. And lastly, lesions of the abducens and of the facial after-forceps delivery have been observed, as have congenital defects of the nerve-trunks of the oculo-motor, of the trochlear, of the trigeminal, of the abducens and of the facial nerves.

ADDENDUM.

My work on the relations of the sphenoidal sinus appeared in Hungarian in the *Orvosi Hetilap* on March 24, 1912, and again in the *Arch. f. Laryng.*, Band 26, Heft 2, 1912. On the same subject a work by Greenfield Sluder, delivered as a lecture in the American Laryngological Association on May 14, 1912, appeared later in the *Arch. f. Laryng.*, Band 27, Heft 3, 1913. Further, in Band 28, Heft 1, 1913, a short epitome of Greenfield Sluder's researches on transverse sections showed that the oculo-motor trochlear, the three divisions of the trigeminal, the abducens, and the Vidian nerve frequently come into close relationship with the sphenoidal sinus. In his second publication Sluder mentions Warren B. Davis's researches, according to which "the sphenoidal sinus already at an early age extends laterally, and comes into closest relationship with the second division of the trigeminal, and that this relationship runs almost constantly through the series. Its development (Davis) begins at the anterior lateral part of the body of the sphenoid, and extends slowly backwards. On the other hand, it rapidly extends laterally until it approaches the foramen rotundum, and then it extends markedly backwards. At the sixth year of life it may have come into the neighbourhood of the Vidian canal." Sluder reports the favourable therapeutic effect upon headache and trigeminal neuralgia of drug treatment of the sphenoidal sinus. These interesting therapeutic experiments are in harmony with the anatomical data, and will doubtless receive further confirmation.

REFERENCES.

- (1) ONÓDI, L.—*Arch. f. Laryng.*, Bd. 26, H. 2, 1912.
- (2) ZUCKERKANDL.—*Anatomie der Nasenhöhle*, 1893.
- (3) SPEE.—"Bardlebens Handbuch der Anatomie," 1896.
- (4) ONÓDI, L.—*Arch. f. Laryng.*, Bd. 15, H. 1.
- (5) KREBS.—*Therap. Monatshefte*, Nr. 9.
- (6) THOMSON, J. A.—*The Laryngoscope*, vol. 15, part 1.
- (7) HOFFMANN.—"Orbitale Komplikationen," etc., "Hand. d. Chir. d. oberen Luftwege," etc., 1912, Ed. 3.

- (8) *Monatsschrift f. Ohrenheilk.*, etc., 1914.
- (9) SCHRÖDER.—*Loc. cit.*
- (10) HOFFMAN.—*Verh. der deutschen Otol. Gesellsch.*, Dresden, 1897.
- (11) LAPERSONNE.—*Arch. d'Ophthalm.*, 1898.
- (12) HALÁSZ.—*Orvosi Hetilap*, 1904.
- (13) SCHMIEGELLOW.—*Soc. danoise d'oto.-rhino.-lar.*, 1908.
- (14) BAUMGARTEN.—*Monatsschrift f. Ohrenheilk.*, etc., 1906.
- (15) PANAS.—*Progrès médical*, 1890.
- (16) BÉRARD, SARGNON ET BESSIÈRE.—*Arch. Intern. de Laryng.*, etc., 1913,
Tome xxxvi.
- (17) ZIEM.—*Arch. Intern. de Laryng.*, etc., 1909.
- (18) KNAPP.—*Amer. Journ. of Med. Sciences*, 1909.
- (19) FINLAG.—*Monatsschrift f. Ohrenheilk.*, etc., 1905.
- (20) FISH.—“A Study of Thirty-six Consecutive Cases of Optic Nerves, etc.”
British Medical Association, Exeter.
- (21) PANAS.—*Loc. cit.*
- (22) ROUGE AND DREYFUSS.—*Gehirn u. Naseneiter*, 1896.
- (23) SCHÄFER AND A. ONÓDI.—Intern. Laryngo.-rhinolog. Kongress, Wien,
1908.
- (24) MOREAU.—*Thèse de Lyon*, 1905.
- (25) HAJEK.—*Pathol. u. Therap. d. entz. Erkrank. d. Nebenh. d. Nase*, 1909.
- (26) SCHRÖDER.—*Zeitschr. f. Ohrenheilk.*, 1909, Bd. 53.
- (27) PAUNZ.—*Arch. f. Augenheilk.*, Bd. 52.
- (28) ONÓDI, L.—*Loc. cit.*
- (29) FUCHS.—“Lehrbuch d. Augenheilk.”
- (30) GOLDZIEHER.—*Arch. f. Augenheilk.*, 1903.
- (31) KÖSTER AND PFLÜGERS.—*Arch. f. Physiol.*, Bd. 89.
- (32) RÖMER.—*Lehrbuch. f. Augenheilk.*, 1912.
- (33) HILGERMANN.—*Zeitschrift f. Ohrenheilk.*, 1901.
- (34) SCOTTI, EVERSBUCH.—*Loc. cit.*
- (35) BIRCHER, EVERSBUCH.—*Loc. cit.*
- (36) JANSSEN, EVERSBUCH.—*Loc. cit.*
- (37) *Revue hebdom. de laryng.*, etc., 1905.
- (38) *Internat. Zentralblatt f. Ohrenheilk.*, 1905.
- (39) WADSWORTH.—*Lancet*, 1885.
- (40) MICHEL.—*Lehrbuch der Augenheilk.*, 1890.
- (41) EVERSBUCH.—“Graefe-Saemisch Handbuch,” 1903.
- (42) *Internat. Zentralblatt f. Ohrenheilk.*, 1907.
- (43) *Ibid.*, *Schwarzkopf*, 1907 u. 1910.
- (44) *Ibid.*, 1909; *Thèse de Paris*, 1908.
- (45) Lombard. *Internat. Med. Congress*, 1908, *Otologie*.
- (46) *Ibid.*
- (47) *Ibid.*
- (48) *Ibid.*
- (49) *Internat. Zentralblatt. f. Ohrenheilk.*, 1911; *Annals of Otol.*, etc., 1910.
- (50) *Ibid.*, 1905, 1908.
- (51) *Monatsschrift. f. Ohrenheilk.*, 40. Jahrg.
- (52) *Internat. Zentralblatt. f. Ohrenheilk.*, 1907.
- (53) *Ibid.*, 1906.
- (54) *Ibid.*, 1906.
- (55) *Ibid.*, 1907.
- (56) *Ibid.*, 1905.

- (57) *Ibid.*, 1910.
 (58) *Ibid.*, 1909; *Annal. des mal. d. l'oreille, etc.*, 1908.
 (59) *Ibid.*, 1909; *Bullet. de laryng.*, 1907.
 (60) *Ibid.*, 1909; *Revue hebdomadaire de laryng.*, 1908.
 (61) GRADENINGO.—*Loc. cit.*, 1909.
 (62) BRIEGER, EVERSBUCH.—*Loc. cit.*
 (63) KÖRNER.—*Die otitische Erkrankung des Hirns, etc.*, 1902.
 (64) *Internat. Med. Kongress*, 1908, *Otologie*.
 (65) RÖPKE, EVERSBUCH.—*Loc. cit.*
 (66) LAFERSONNE.—*Société française d'ophthalmologie*, 1907.

INTERNATIONAL CONGRESS OF MEDICINE.

SECTION XV.—LARYNGOLOGY.

SIR STCLAIR THOMSON, *President, in the Chair.*

Abstract Report by DAN MCKENZIE.

Discussion on the Recent Progress of Endoscopic Methods as Applied to the Larynx, Trachea, Bronchi, Œsophagus and Stomach.

(Continued from p. 327.)

The Direct Method in the Years 1911 and 1912.

Report by CHEVALIER JACKSON (Pittsburg, U.S.A.).

The speaker began by asking, "Who shall do endoscopy of the larynx, tracheo-bronchial tree, œsophagus and stomach?" From an inquiry sent out to 380 American laryngologists, it was shown that only 35 of them cared to do bronchoscopic or œsophagoscopic foreign body work, and only 79 of them had attempted such work. All laryngologists should be able to examine the young child's larynx by the direct method, but per-oral endoscopy of the tracheo-bronchial tree should be relegated to properly trained and equipped men, at least one of whom should be found in every large city. Lack of opportunity, training and organisation resulted in lack of promptitude and precision in foreign body work and consequently in a raising of the percentage mortality. And the same consideration applied to diagnostic and therapeutic work on the œsophagus.

Mortality and Results of Bronchoscopy for Foreign Bodies.—The mortality due to the method should be distinguished from the mortality due to lack of precision and promptitude. Out of 171 cases reported by other workers 4 deaths were due to asphyxia from want of prompt bronchoscopy, and nine (5·3 per cent.) died from other causes. Of the 171 cases of foreign body, 156 were removed, 140 by per-oral and 22 by tracheotomy bronchoscopy. Of the 15 unsuccessful cases, in 12 the foreign body could not be found, and only 3 were failures to remove it when found. In 4 of the former the foreign body had escaped into the deeper minute

bronchi. The speaker's statistics showed a mortality of only 3 out of 182 cases, all of which were per-oral bronchoscopies. In 5 of these 182 cases the foreign body, a small one lying in a small bronchus near to the periphery of the lung, could not be found.

Mortality and Results of Œsophagoscopy for Foreign Bodies.—In 193 cases reported by various operators there were 12 deaths (7.8 per cent.) in 8 of which the foreign body was lodged in the upper third; 4 of the patients died during operation with the foreign body *in situ*. In 7 of the 8 the operation had been undertaken by operators whose total number of cases was less than 3 and who did not realise the danger of Œsophageal trauma. The foreign body was removed in 155 of these 193 cases, and of the 38 not removed, 26 went down.

In the large clinics (from statistics previously published), out of 210 foreign bodies in the Œsophagus all were removed, but twelve of these went down.

Of the speaker's 206 cases of Œsophageal foreign body 8 only defied his efforts and went down. Four cases died, one a woman with advanced nephritis; in the other three the Œsophagus had been severely lacerated before he saw them. Apart from the traumatism due to foreign bodies and their extraction, skilful Œsophagoscopy is practically free from mortality.

Mortality of Gastrosocopy.—Out of 110 cases done by eight operators there had been no deaths. The speaker had examined 238 stomachs with only one death subsequent to it in a patient already moribund when admitted.

Radiography in Relation to Per-oral Endoscopy.—Instantaneous radiography shows foreign bodies not visible with longer exposures (Tilley).

The radiogram should be taken with the chest fully expanded by a deep inspiration so as to lessen the density of the thorax, but care must be taken to allow for the consequent displacement of ribs, viscera, and foreign body. For small peripheral foreign bodies lateral radiography is of great value, especially in combination with the caliper-guide, by which the end of the bronchoscope can be brought close to the foreign body. The lateral orientation of the bronchoscope depends upon a mark on the skin determined by an antero-posterior radiograph. In difficult cases the author facilitates localisation by superimposing a transparent film of the tracheo-bronchial tree over the negative of the patient showing the foreign body. The position of the film is fixed by two marks on the film indicating the dome of the pleura and the dome of the diaphragm. In making these pattern films, which are made in twelve sizes, the injection preparations of Brünings are utilised. When one lung shows dark in the radiograph and the other clear, the dark side usually corresponds to the foreign body, but exceptions to this rule have been recorded. A negative report from the radiographer is not to be relied upon, but with the improvement in technique errors are becoming less frequent. Bronchoscopy should be performed notwithstanding negative reports when the history leads us to suspect a foreign body. And the absence of symptoms, likewise, should not deter us, as the passages are often very tolerant of the presence of a foreign body. In the same way, Œsophagoscopy should always be resorted to in suspected disease of the gullet.

Instruments.—Success depends more upon the skill of the operator than upon the particular instrument employed. No Œsophageal instrument is absolutely safe.

For the upper end of the Œsophagus the speaker finds an elongated laryngeal speculum very useful, as it is less likely to override highly

situated foreign bodies, and it can be employed to dilate strictures in this location. Many electrical and hydraulic aspirators have been devised to remove secretions, but the speaker prefers an aspirator in the wall of the endoscope, the exhaust being an aspirating syringe. A positive pressure apparatus is *en suite* of the syringe, and can be employed to force out clots, etc., when necessary. He does not use an aspirator in bronchoscopy, but contents himself with sponging.

Preparation of the Patient.—In all obstructive disease of the œsophagus the patient should be made to regurgitate after taking a copious draught of water, so as to make sure that dilatations or diverticula are emptied. The presence of food in the œsophagus incommodes œsophagoscopy, and is dangerous when a general anæsthetic is used. If possible the patient should be prepared for endoscopy in the same way as for any other operation—by a cathartic, rest in bed, etc.—and the mouth should be carefully disinfected. Aseptic technique is essential.

Position of the Patient.—Foreign bodies, especially when situated in the larynx and pharynx, should not be touched until the patient is in the Trendelenburg position.

For direct laryngoscopy Kirstein's position is best. It consists in an anterior movement of the cervical spine coupled with extension at the occipito-atlantoid joint. To hang the head over the end of the table, in the dorsal position, renders endoscopy difficult. In the dorsal position laryngoscopy is easy in Johnson's position, *i. e.* with the head flexed and the operator on the left of the patient. For bronchoscopy in the prone position Boyce's device of moving the cervical spine forward by raising the head is best, though it necessitates trained assistance.

Anæsthesia.—If a general anæsthetic is used the cough-reflex should not be abolished, as it aids the expulsion of secretion. In children under six the speaker uses no anæsthetic, either local or general, save at times to prevent vomiting or coughing, when a sharp foreign body threatens perforation. In adults, also, the speaker performs œsophagoscopy without any anæsthetic, save, again, in the case of sharp foreign bodies. The drawback to a general anæsthetic is the risk of respiratory arrest when the operator begins to manipulate the foreign body. Local anæsthesia, if used at all, is limited to the regions above the cricoid. For direct laryngoscopy an anæsthetic is only occasionally necessary. Local anæsthesia of the epiglottis and larynx is needed in bronchoscopy for diagnosis. Tracheotomy at all ages should be done under local, never under general anæsthesia. Intra-tracheal insufflation anæsthesia with N_2O and oxygen is used for gastroscopy by Janeway.

Technique.—The speaker condemned the use of the mandrin.

Direct laryngoscopy is the only method whereby the larynx of young children can be examined. He defended direct laryngeal operating at all ages, and insisted upon careful training as necessary to acquire dexterity. An assistant should be at hand to exercise external pressure on the thyroid cartilage, as this lessens the amount of pressure to be exerted by the left hand of the operator on the tip of the endoscope. Papilloma of the larynx in adults is curable by direct removal and the application of alcohol, but the treatment must be long-continued in some cases. The same is true of most cases of papilloma in children, but sometimes laryngostomy with X-ray applications to the open larynx is necessary. Direct application of the galvano-cautery in laryngeal tuberculosis is preferable to the indirect method, and the removal of suspected malignant tissue is rendered by the direct method precise and reliable.

Bronchoscopy.—Forceful extraction of foreign bodies, such as open

safety-pins, is inadvisable. In addition to the removal of tumours, which seem to be rare in the trachea, bronchoscopy is being used in the treatment by local remedies of asthma and other diseases. Bronchoscopy should be employed when (1) the radiograph shows a foreign body or a suspicious shadow; (2) when there is a history of foreign body; (3) where there are signs of tracheal or bronchial stenosis; (4) if there are physical signs of phthisis, and especially of pleural effusion, without tubercle bacilli in the sputum, especially when the signs are located at the base of the lung, even when there is no history of foreign body; (5) in all cases of bronchiectasis; (6) when there is dyspnoea not due to obvious cardiac or pulmonary disease; (7) when dyspnoea is not relieved by tracheotomy; (8) in cases of hæmoptysis not definitely tuberculous; if severe, endoscopic packing may be tried (Killian) (in hæmoptysis the speaker had found the cause to be aneurysm three times, cancer twice, and syphilis twice); (9) in recurrent paralysis of unknown origin; (10) in thoracic disease of doubtful character. In all cases of doubt bronchoscopy should be done.

Subglottic œdema is due to the use of unduly large tubes or to faulty manipulation. By attention to these points the speaker had been able to abolish subglottic œdema in infants after bronchoscopy. Dyspnoea occasionally sets in, but it is due to accumulation of bronchial secretion, and if that is removed by re-inserting the bronchoscope the dyspnoea disappears. For this reason he advises that post-bronchoscopic dyspnoea in infants should not be ascribed to subglottic œdema until the tube has been passed again and the secretions removed. The tubes he uses in infancy are from 4 to 5 mm. internal diameter for children under six years, the 4 mm. tube being for infants under one year. He has successfully removed a foreign body from an infant aged $2\frac{1}{2}$ months. Faulty direction of the tube will injure the subglottic region, and for this reason he condemned the Rose position and the use of heavy-handed instruments.

Per-oral or Tracheotomic Bronchoscopy: Which?—As a tube of 4 mm. diameter is sufficient for the manipulation of foreign bodies in infants, the speaker finds tracheotomy unnecessary. But if an operator's skill is insufficient, and a large tube has to be used, tracheotomic bronchoscopy is preferable. Bronchoscopy of the upper lobe is possible if the tube is carried to the opposite side of the mouth, the child's head being carried by an assistant to the side opposite to the lobe to be explored. If dyspnoea renders the patient's condition dangerous, tracheotomy may be necessary, but the speaker relieves such dyspnoea by per-oral bronchoscopy, and artificial respiration with the insufflation of oxygen, etc. In per-oral bronchoscopy the tube is more easily manipulated.

Pleuroscopy.—A case was narrated in which the author successfully removed through a small opening in the chest-wall a primer from a shot-gun cartridge. The child, under general anæsthesia, was placed in the sitting position, so that the foreign body fell to the diaphragm.

Œsophagoscopy; Contra-indications.—If there is water-hunger, gastrostomy should be performed before œsophagoscopy.

Œsophagoscopy for Foreign Bodies.—With general anæsthesia and full muscular relaxation any foreign body that has gone down the œsophagus can be got out again. Force must be avoided, and turning or morcellation employed if the foreign body is impacted.

Cardiospasm, Phrenospasm and Abdominal Œsophagismus.—He advised the use of three words indicating types of spasms, which may be met with separate or together. These are (1) spasm at the hiatus, due

to diaphragmatic and not to œsophageal contraction, *phrenospasm*; (2) spasm of the abdominal œsophagus—*abdominal œsophagismus*; and (3) the rarest of all, spasm of the cardiac orifice—*cardiospasm*. These conditions are neurotic, but in some cases the spasm is secondary to definite lesions of the œsophageal or gastric mucosa. Further, these lesions may lead to organic stricture. Kinking of the œsophagus from enlargement of the left auricle has been observed. In spasmodic stricture food accumulates above, and trickles slowly through into the stomach, and the author has seen nausea follow cure of the spasm from the stomach being unaccustomed to the sudden introduction of food. He dilates these strictures with Mosher's divulsor. The most obstinate cases to treat are those where the spasm dates from childhood.

Cancer of the Œsophagus.—In removing tissue for the microscope, the muscular coat of the gullet must not be opened up. In urgent cases gastrostomy should precede œsophageal examination. Endoscopists attach importance in the diagnosis of cancer to asymmetrical respiratory movement of the œsophageal walls. In making this observation, the patient's head and body must be held straight, otherwise the normal œsophageal respiratory movement will be asymmetrical. At present œsophageal cancer is invariably fatal, but in future the treatment of the precancerous leukoplakia, erosion, maceration, chronic œsophagitis, etc., will reduce the occurrence of cancer, and when cancer can be diagnosed early, resection of the thoracic œsophagus will be employed.

Gastroscope.—The gastrosopic lenses should be introduced through a straight tube passed under inspection. The usefulness and safety of the gastroscope in obscure stomach disease are established facts. Unlike tracheo-bronchoscopy and œsophagoscopy negative findings are less to be relied on than positive. The distal end of the gastroscope may have its range of mobility increased by flexing the patient's knees on the abdomen so as to relax the abdominal wall (Janeway).

DISCUSSION.

O. CHIARI (Vienna) reported that in his clinic since 1909, 182 foreign bodies had been removed from the œsophagus under œsophagoscopy. In all the foreign body was successfully removed. There were two deaths from mediastinitis due to injuries inflicted by the foreign body. Three cases with mediastinitis were saved by mediastinotomy. Three foreign bodies were removed from the trachea. Of twenty-three foreign bodies in the bronchi, eighteen lay in the right side and five in the left. Once extraction was declined. All the others were removed; in young children tracheotomy was performed.

Neoplasms in the Trachea and Bronchi.—Eight cases. In the trachea a case of endothelioma and one of cylindroma were seen. A round-cell sarcoma below the eighth ring was removed under direct tracheoscopy with forceps, curette, and snare followed by the galvano-cautery. Healing followed. A sarcoma of the right bronchus the size of the end of the thumb was spontaneously coughed up after bronchoscopy. Two cases of tracheal carcinoma and one of adenocarcinoma of the bronchus were treated with snare, forceps, curette and radium. Tumours compressing the trachea from without were described.

One case died during bronchoscopy, but the *post-mortem* showed that death was due to hæmorrhagic pancreatitis (*Pankreasapoplexie*).

Suspension laryngoscopy had been employed some twenty times, and

was favourably spoken of. The speaker uses a broad tongue spatula, so as to prevent the bilateral projection downwards of the tongue.

RICHARD LEWISOHN (New York) described his rectangular telescopic œsophagoscope, which can be passed with the patient's head in the normal position and proceeds in the longitudinal axis of the œsophagus.

WOLFF FREUDENTHAL (New York) recommended suspension laryngoscopy to facilitate the removal of infiltrations and the curetting of ulcers in laryngeal tuberculosis. It had also been of service in papilloma in children without an anæsthetic. He also advised its adoption when deep pharyngeal and laryngeal abscesses were to be opened.

INO KUBO (Fukuoka, Japan) reported 150 cases of foreign body in Japan which had been treated by the direct method. In Japan people with foreign body in the œsophagus sometimes swallowed paper amulets from the temples in order to remove the obstruction, as a result of which the œsophageal lumen is often still more narrowed.

In removing tooth-plates, a corner of the plate should be sought and loosened from the swollen mucosa in order to obtain a grip.

In carcinoma of the œsophagus the œsophagoscope is used not only for diagnosis, but also for treatment, such as the removal of small growths, the application of radium, or the introduction of a permanent cannula which renders gastrostomy unnecessary.

Four patients with simple stenosis had been treated by dilatation after gastrostomy. Two recovered and two are still under treatment. He had successfully opened from within a peri-œsophageal abscess secondary to caries of the dorsal vertebræ.

Of foreign bodies in the air-passages twenty-eight cases had been reported in Japan.

In suspected asthma endoscopic examination had occasionally revealed aneurysm. In true asthma intra-bronchial painting with cocaine-adrenalin solution was easily performed through the tube.

The effects of beri-beri on the larynx (recurrent paralysis, œdema of the arytenoid region, anæsthesia of the mucosa) had been reported by the speaker as a result of his direct examinations.

BRADEN KYLE (Philadelphia) advised the use of local anæsthesia if possible. When foreign bodies lay in the upper part of the œsophagus or air-passages, the Trendelenburg position should be used. He referred to his case alluded to by Professor Jackson, in which he had removed from a man, aged seventy-two, a plate of false teeth which had been swallowed eighteen years previously. The plate was embedded in fibrous tissue, but removal was effected without serious trauma. The patient had lived on fluids for eighteen years and the ability to swallow had been lost. By passing a soft rubber catheter frequently the power to swallow had been educated to the extent that the patient was now able to swallow semi-solid food.

JULIUS LONDON (New York) exhibited and described his gastroscope and its mode of employment.

J. MOURET (Montpellier) described and demonstrated his method of posing the patient for endoscopy. The patient is seated stride-legs on an ordinary chair facing the back of it. The body is inclined forward from the hips at about an angle of 45° to the horizon. His head is first somewhat sunk in the neck and slightly extended, but it is never fully extended. The operator stands facing the patient. The tube is passed in the usual manner, the operator crouching or stooping as it enters the mouth, rising gradually to the erect position as the instrument glides over the epiglottis. When the incisor teeth are long and prominent, or when

the patient does not open his mouth wide enough, the patient is made to incline the trunk still more forward, the operator placing one hand on the top of his head to prevent him straightening the trunk. In this way the tube can be passed without any assistance. If the larynx slips forward under the base of the tongue, making the patient bend his back into a stooping attitude will remedy it. The method is easier both for patient and operator than the usual one. A similar procedure may be adopted when the patient is lying down, in which case the lateral position with the body bent is adopted.

WILLIAM HILL (London) showed his patterns of endoscopic tubes, drawing attention to the value of the slotted laryngoscope. He also showed a gum-elastic tracheal catheter he had devised for the administration of general anæsthetics. It was provided with a circular fine rubber shoulder or tent which prevented blood from entering the air-passages, in a manner similar to what was sought for with Kuhn's per-oral intubation tube. He asked how Dr. Chevalier Jackson was able to carry out laryngoscopy and bronchoscopy in children without any anæsthetic, local or general.

H. MARSCHIK (Vienna) had had good results with two methods of posing the patient: (1) Half-sitting, half-lying, in old, nervous or stout patients, and (2) when excess of mucus was present in a position resembling that described by Mouret, the upper part of the body horizontal and with the head inclined back. He narrated a case in which tracheal stenosis from membrane, supposed to be diphtheritic, had been treated, after tracheotomy, by bronchoscopy and the removal of a thick membrane. The case terminated unfavourably, however, probably by the onset of pulmonary oedema.

H. TILLEY (London) exhibited a large green pea he had removed from the bronchus of a man, aged sixty-four, by aspirating it into the bronchoscope with a piston made of a plug of moist wool mounted on a long probe and passed down to the foreign body. He, also, expressed himself strongly in favour of general narcosis in children and nervous patients, aided by morphia and atropin hypodermically.

HARRIS P. MOSHER (Boston) recommended the open speculum, particularly since it had been made adjustable, and so suitable for all cases. He had found ballooning of the œsophagus under strong pressure of great service, especially in diagnosing pouches. He also had experienced benefit from the repeated curetting, under general anæsthesia, of certain cases of œsophageal cancer.

A. LOGAN TURNER (Edinburgh) had found suspension laryngoscopy of great service in examining the larynx of young children and in operating on the larynx at all ages. It had proved useful in the diagnosis of post-cricoid cancer and in the removal of foreign bodies situated in the mouth of the œsophagus. It was also of value in demonstrating laryngeal and hypo-pharyngeal lesions.

E. B. WAGGETT (London) held that endoscopy should not be too strictly retained in the hands of a few surgeons. All laryngologists ought to practise the method.

R. H. SKILLERN (Philadelphia) extolled tracheo-bronchoscopy in the diagnosis of obscure cough, dyspnoea, dysphagia and hæmoptysis. He also advised that every laryngological clinic should use the method.

Prof. KILLIAN, in reply, said that while Dr. Mosher's method of curetting œsophageal cancer might often be of value, still there were risks in employing it, not only of bleeding, but also of infection and consequent mediastinitis. He further warned against pushing on, at all costs, with

endoscopic methods in a case where serious difficulties cropped up. Especially was this the case with foreign bodies like beans in the air-passages. In these cases, he repeated, tracheotomy should be performed early, and the examination made through the tracheal opening.

Dr. CHEVALIER JACKSON, in reply, said, *inter alia*, that Dr. Kyle's case proved how even large foreign bodies could be safely removed without external operation. He agreed that all laryngologists should make themselves experts in this particular method, but those who had not done so should not assume the responsibility of attempting it in cases which urgently required treatment.

With regard to the question of anæsthesia, he thought his remarks had been misunderstood. In certain cases he did employ general anæsthesia. In bronchoscopy in adults he sometimes used local, rarely general anæsthesia, and occasionally none at all. In children under six years of age he employed no anæsthesia at all, and was convinced that it was not so disagreeable as tonsillectomy without anæsthesia.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

May, 1913.

(Continued from p. 104.)

Atrophic Rhinitis with Ozæna: Its Ætiology and Surgical Treatment.—Francis P. Emerson (Boston).—The interest of the profession in the ætiology of ozæna seems from the literature to be centred upon two methods of procedure: (1) In an attempt to isolate a specific organism; (2) in looking upon the symptom-complex as due to pus-producing organisms, causing multiple foci. The difficulty in isolating a specific organism arises from the innumerable bacterial flora, resulting from decomposition and secondary infection. The second procedure does not admit an essential or primary atrophy as an intermediate step in the disease.

Theoretically, a specific pus-producing organism might cause fœtor and crusting without a true atrophic process. That tuberculosis and syphilis are the underlying causes of ozæna, except in a small percentage of cases, is not probable. Bosworth's theory of a preceding purulent rhinitis in infancy without a sinus infection is questioned. The *post-mortem* reports of Pearce and Winne show sinus involvement as early as the second year in the course of the infectious diseases. What seems to be an atrophic process is always improved by drainage. Radical surgery, by establishing better drainage of sinuses, lessens the tendency to crust-formation. Is atrophic rhinitis, then, a misnomer? The general systemic symptoms are secondary. The writer's cases have shown the morbid process more often to be in the ethmoidal and sphenoidal sinuses; next often in the ethmoidal, sphenoidal and frontal; and, last, the ethmoidal, sphenoidal and antrum.

There are two types of clinical cases—one the typical cases of Fraenkel, and the other the atypical cases, with fœtor and crusting. The atypical cases are less open to question in regard to sinus involvement. The third stage of the disease is more easy to cure. The after-treatment is as important as the surgical exenteration. Fœtor does not indicate a more

intractable case. The serious obstacle to cure arises from an abnormality in the development of the bony cells. When such abnormal cells are present, certain cases of ozæna are incurable by any intra-nasal method. All cases are easily re-infected, but respond to local applications if the drainage is good.

The study of the cases presented, and of similar cases, has led to the belief that ozæna is the sequel of a focal infection. Clinically the course of events is as follows: a septal deviation is followed by a chronic catarrhal ethmoiditis which interferes with drainage to such an extent that a subsequent active infection results in a sinusitis. The fetor and crusting are probably due to the direct action of a specific pus-producing organism on the tissues, without any preceding true atrophic process. The difficulty in establishing free drainage where there is an abnormal anatomical development of the bony cells makes the cure of certain cases of ozæna impossible with any intra-nasal procedure.

Dr. WOLFF FREUDENTHAL said some writers still believe that tuberculosis is the cause of ozæna. He had not found this to be the case. He had seen hundreds of cases, of which not more than half a dozen were associated with tuberculosis. Ozæna begins as rhinitis sicca, the fetor which characterises the condition being produced by something not yet determined. Then rhinitis atrophicans develops, and finally ozæna. The sphenoidal sinus is very frequently involved. Curetting the sinus and establishing drainage does not cure ozæna, though it may improve it. Patients should be kept under observation, as good care is an essential part of the treatment. Some cases of ozæna are suddenly cured.

Dr. ROBERT C. MYLES had never seen a case of ozæna begin after puberty that did not have its origin in a purulent rhinitis which began before puberty. The odour which characterises ozæna disappears upon opening the sinuses and removing crusts, as he has observed in a large number of cases. One of the factors of atrophic rhinitis is arrested development, and the important point is to check this disease before puberty. If operated upon between twenty-five and forty excellent results are obtainable. He had done very little operating in the early stages.

Dr. LEE M. HURD cited a family of three children, two girls and a boy, who were brought to him about fifteen years ago for the removal of adenoids and tonsils. He had watched them from time to time since then, and all seem to have true atrophic rhinitis. In ozæna cleaning out the sinuses will relieve the rhinitis and the patients will do well. Clearing out the ethmoid and correcting deflections of the septum will also prove beneficial. The *Bacillus bulgaricus*, given in the form of sour milk, zoolak, etc., forms an important part of the medical treatment.

Dr. DUNBAR ROY reported having examined over 3000 negroes during the last three years in connection with the medical college, and he had found only one case of atrophic rhinitis and but few sinus troubles among them. The sinuses of negroes were free from pus formation. This might bear some relation to the question of atrophic and ozænous conditions being due in part to sinus involvement. These patients have flat noses and large cavities, and also a gelatinous condition of the turbinates, but atrophic rhinitis and ozæna, in his experience, are practically unknown among them.

Dr. JOHN R. WINSLOW asked why, if atrophic rhinitis be due to nasal accessory sinus disease, it begins at an age when the sinuses are least developed, *i. e.* in childhood. If not due to this, why is there such an

enormous diminution in the number of these cases since nasal sinus surgery has been developed? These cases are now so much rarer that the Ozæna Commission had found it difficult to find men with sufficient experience to serve on that commission. He concurred in the belief of Dr. Freudenthal that there are at least two distinct pathologic conditions, designated under a common name.

Dr. EMERSON, in closing the discussion, said he did not expect to settle any of the controversial questions involved in the subject under discussion. On the other hand, he merely wished to give a personal experience covering cases of the worst type of what not only he but others have called ozæna.

Suspension Laryngoscopy, with Demonstration of Method.—Wolff Freudenthal.—Suspension laryngoscopy had been employed by the author for more than nine months. The method, previously described in full in the *Medical Record* for February 22, 1913, was not given in detail in the paper. Certain additional points, however, were emphasised. (1) Good illumination is an essential feature of suspension laryngoscopy. The best for operative work is the Kirstein headlight. For other work a small lamp (or two) attached sideways may be helpful. (2) A room that can be darkened, absolute darkness being unnecessary. (3) An assistant experienced with handling the apparatus. (4) Satisfactory means for holding down the epiglottis. The author has devised an instrument which consists of a silver wire fastened in the groove of the spatula and ending in two thickened points. These can be pushed forward, and when they are in that position the epiglottis will remain *in situ*. By means of a hook the wire can be brought forward or backward. Albrecht, of Berlin, has published a similar modification of a tongue-holder.

Among the cases treated by means of suspension laryngoscopy, the author detailed cases of tuberculosis of the larynx, abscess formations, tonsillectomies, papillomata of the larynx in children, benign neoplasms in adults, and foreign bodies in the larynx and pharynx.

Dr. JOHN W. MURPHY had experienced a little difficulty at first in introducing the speculum. He does not follow the tongue, but the pharyngeal wall instead, finding this the more satisfactory procedure. In removing an enormous papilloma he had found it much easier to work with the suspension apparatus. The assistant can make pressure over the larynx and bring the anterior commissure into view. He cited a case in which the patient was suspended for twenty-five minutes. This man had a very tolerant larynx, and found that when the instrument was properly placed it was no more uncomfortable than the ordinary mouth-gag. The head of the patient should not be raised, but should be turned to the side. The Albrecht instrument would prove an addition to this work. By following the pharynx and not the tongue the Albrecht instrument comes readily into place.

Dr. H. HOLBROOK CURTIS referred to a case in which he had found it impossible to introduce the Jackson laryngoscope, and in which a number of expert laryngologists had failed to introduce the straight speculum. He took the patient to Dr. Freudenthal, who successfully employed this suspension apparatus. In the removal of papillomata and other growths from the pharynx and larynx this method seemed a distinct step in advance. In the case cited the girl had recurrent papillomata. He had removed a firm growth almost occluding the larynx by the indirect method, but was amazed by the facility with which the operation might have been performed by use of the suspension apparatus.

Dr. FREUDENTHAL preferred to use the headlight for the reason that the light at the end of the speculum is apt to be obscured by blood. He had never tried the method on the cadaver, but had employed it immediately upon the living subject. The head is lowered gradually and the Albrecht instrument slipped in slowly. In cases with abscess-formation, for example, he knew of nothing better than the method under discussion. For the removal of growths on the posterior wall this method is advantageous, as it is very difficult to hold the instrument in the larynx by the straight method.

The Treatment of Persistent Otorrhœa in Infants and Young Children by the Establishment of Post-Auricular Drainage.—

Wendell C. Phillips (New York City).—By persistent otorrhœa in infants and young children the author means cases in which an acute purulent inflammatory process invades the middle-ear space, and continues without abatement for an indeterminate period after the usual five to thirty days, which ordinarily may be considered as its normal course. This type of purulent otitis media should be differentiated from that other rather common class, which may be termed "recurrent," in which recovery takes place from each attack only to be followed by recurrence at varying intervals, usually as a result of an acute rhinitis. It soon becomes evident, in the persistent otorrhœa, that the small tympanic cavity proper could not secrete the amount of pus which flows from the ear, and one is forced to the conclusion that the aditus and mastoid antrum at least must be involved. When the discharge has continued beyond about the third week it may be concluded that the case is rapidly becoming chronic and that different treatment is demanded. All the usual non-surgical measures having failed, the wisdom of surgical interference must be considered. In the author's opinion, the safest and most rational measure is the establishment of post-auricular drainage, and hence through-and-through drainage, by means of the simple mastoid operation. The reasons for this are as follows: (1) It quickly terminates an otherwise persistent otorrhœa. (2) It insures against an extension of local bone necrosis. (3) It prevents the case from becoming a chronic purulent otitis media, with offensive discharge, loss of hearing, bone necrosis, and possible fatal complications. (4) It accomplishes restoration and retention of the hearing function.

In a considerable number of operations he had been surprised at the frequency with which the pus escapes under pressure through the opening made into the mastoid antrum. Granulation-tissue is also present, and in several cases an exposed sinus or dura had been found. These cases operated upon have complained of discharge for from six weeks to five years. In the more chronic ones the simple mastoid operation has sometimes proved insufficient, and the radical mastoid operation has become necessary. In young children, when performed any time between four weeks and three months, the results have been most favourable.

Dr. SAMUEL J. KOPETSKY emphasised the point brought out by Dr. Phillips that these cases have passed the acute stage, and do not at the time of operation present the usual classical signs of acute mastoiditis, but they present evidence of a tendency toward chronicity. If it is proved, as Dr. Phillips seems to report, that one can accomplish a cure in these cases by the simple mastoid operation, then, under these circumstances, this operation should be resorted to oftener than it is performed at the present time, because it will save the hearing, and in many instances prevent the performance of the radical and all that this

implies. Under Dr. Phillip's direction he had operated upon three such chronic suppurative cases in adults, who had been suffering from discharging ears for over a year. The results of all these cases will be published subsequently.

Dr. JAMES F. McCaw emphasised the significance of persistent discharge, which he considered as evidence of involvement of the antrum at least. He did not believe it could be cured without post-auricular drainage or more radical procedure. He had operated many times in the presence of thick, persistent discharge, and which could not be cured by other measures, with most satisfactory results.

Dr. WILLIAM B. CHAMBERLIN had made it a rule, both in private and hospital practice, to operate upon the class of cases under discussion after six weeks, even in the absence of swelling, mastoid tenderness, and obliteration of the post-auricular fold. It had been a surprise to him to find how often the pus was under pressure. In no case had he failed to get good results. The child comes eventually to radical mastoid operation, with considerable loss of hearing, if this is not done.

Dr. HENRY O. REIK asked Dr. Phillips why this operation is distinguished by a special title—"post-auricular drainage"—if, as appeared from his description, it is a simple mastoidectomy. And if it differs in any way from the ordinary simple mastoidectomy, in what respect does it differ. In addition, the arguments adduced in favour of this operation sounded strangely like those offered some little time ago by Mr. Heath, who was severely criticised because, it was said, his leaning was toward operating upon every case of suppurative otitis media.

Dr. EWING W. DAY has an X-ray picture taken, and if pus in the antrum is demonstrated he operates, if pus is not demonstrated he does not operate. These are mostly clinical cases—children whose vitality is below par, and whose resistance is poor, but it has been found that they respond very well to treatment with vaccines. In private cases he has found that the vaccines do no good whatever.

Dr. JOHN F. CULP cited the case of a little child, sent to him by the family physician, with a tentative diagnosis of mastoiditis. There was a history of three attacks of discharge from the ear within six months. Examination revealed none of the signs of mastoiditis, and the patient was sent home, with the suggestion that the physician keep it under observation. About two weeks later the child contracted a cold, a swelling appeared behind the ear, was operated upon by his assistant, and complete destruction of the mastoid was found. The lateral sinus was exposed. He regretted that he had not heard Dr. Phillips' paper before he saw the case the first time.

Dr. D. J. GIBB WISHART thought the point well taken by Dr. Reik that the title of the paper hardly brings out the meaning which the author has in view. He illustrated the point by citing a case upon which he operated three days before he left home. The patient, a man, with an acute otitis media and discharge from the ear, was taken into the hospital, kept there for five weeks, and then sent home. At the end of seven weeks thereafter, during which time the ear had been discharging, he was brought to the speaker, who found that the family physician had made four or five incisions behind the ear, down to the bone, from all of which pus was oozing. There was plenty of post-auricular drainage, but the patient was very badly in need of a mastoid operation. He had been in the habit of operating upon these cases, in adults and children, exactly in line with the paper, because he believed that by this means the patient's hearing can be saved.

Dr. PHILLIPS, in reply, said he had had some X-ray pictures taken, but they are of no assistance beyond the antrum, for the reason that in young infants there are no mastoid-cells. He believed success in these cases is due to the through-and-through drainage, just as described in the paper. He had distinctly stated that it was a simple mastoid operation. The comparison with Heath's operation was interesting. The cases in which Heath gets favourable results are those in which he does the simple mastoid operation; those in which he gets unfavourable results are those which require radical mastoid operation.

Abstracts.

NOSE.

Paget, Owen F.—Adenoids as the Parents of the Incapable Nose. "Australasian Medical Gazette," January 31, 1914.

Paget has found adenoids as common, if not more so, in the perfectly dry atmosphere of Western Australia as in the damp one of London. It is difficult to find factors common in London and Western Australia. The only three apparent are, bottle-feeding of babies; the large use of patent foods; Western Australian mothers believe in soft food for children. Constant sucking of a rubber nipple brings about a Bier's suction effect in the naso-pharynx. The nature of the food given leads to deficient lime-salts in the bones, the soft bones being subject to atmospheric pressure from without. A partial vacuum being created by the constant sucking, displacement takes place. *A. J. Brady.*

Bonnier, Pierre (Paris).—Hæmorrhoids and Bulbar Tonicity. "Archiv. Internat. de Laryngol., d'Otolog., et Rhinolog.," July–August, 1913.

Among the disorders of the bulbar regulating centres, which as a whole constitute what one calls arthritism, hæmorrhoidal crises, be it by their paroxysmal character or by the facility of their alternation with other manifestations arising from the neighbouring bulbar centres, clearly affirm their nuclear origin. The centres of the hæmorrhoidal region in the bulb occupy the inferior part of the column of the digestive centres. These centres are in association through the fifth cranial nerve with certain areas on the nasal mucosa of the inferior turbinate. The point corresponding to the hæmorrhoidal centres in the nose is situated behind the genital segment, and below the utero-vesical segment and the sciatic point. This region of the head of the inferior turbinate allows us by slight cauterisation to favourably influence amenorrhœa, dysmenorrhœa, leucorrhœa, gonorrhœa, impotence, genital excitation, the internal secretions necessary to growth, the general tonicity, and to that aggregate of moral and physical tonicities to which we have popularly given the physiological name of virility, arterial tension, and the anatomical and physiological state of the urinary apparatus.

Higher up, one reaches the sensitive bundle for the chiasma. Here one can cause the disappearance of sciatica and lumbago. The centres of rectal and anal tonicity with the tenesmus, incontinence, prolapse, anal catarrh, dystrophy of the venous walls, hæmorrhoids, fissures, perverse innervations of the motor and the sensory centres of this apparatus are found in the bulb at the foot of the centre for the trigeminal fibres, which

arise from this nasal point. The awakening of these centres causes the disappearance of troubles even of remote onset arising from their derangement. Bonnier gives notes of some twenty-one diverse cases of the aforementioned disorders, in which cauterisation of these nasal areas has produced favourable results.

J. D. Lithgow.

Paget, Owen.—**A Simple Suggestion for the Prevention of Pneumonokoniosis, Pulmonary Tuberculosis, and Allied Disorders.** "Australasian Medical Gazette," December 20, 1913.

The nose is the filter of the lungs. Proper filtration stands for the abolition of pneumonokoniosis and allied disorders. It should cause an enormous diminution in pulmonary tuberculosis, pneumonia, influenza, etc. Operatives in mines and factories will not suffer from their occupations. The form of nasal obstruction here discussed is not due to adenoids or to any intra-nasal growths or deformities. It is due to the lateral cartilages of the nose being pressed by positive air-pressure against the septum. The levator muscles of the alæ have become atrophied by disease. As remedies we have—(1) education of the nasal muscles, which can only be done with children in their school drill. (2) Operation. On no account should any operation on the interior of the nose be done. A buried suture attaching the cartilage to the nasal bone is all that is required. (3) The use of silver nasal props or supports.

A. J. Brady.

Ritchie, Delman.—**An Unusual Case of Osteoma of the Superior Maxilla** "Laryngoscope," February, 1913.

The patient, an adult male, had had complete nasal stenosis for seventeen years. Two previous operations had been performed, one through the natural passages and the other by an incision in the left side of the nose, which had left a discharging sinus near the left inner canthus. Examination showed the nose to be completely filled on both sides with a bony mass, which also filled the naso-pharynx and pushed the left eye upwards and outwards, producing diplopia. An exostosis of ivory hardness was removed piecemeal through an incision down the left side of the nose with an extension below the left orbit. The mass was the size of a fist, had extended into both antra, caused practically complete disappearance of the septum and most of the ethmoidal cells.

Recovery was uneventful, and three months later there was no recurrence.

A. J. Wright.

LARYNX AND TRACHEA.

Menzel, K. M. (Vienna).—**On the Question of Displacement of the Larynx and Trachea due to Changes in the Thoracic Organs.** "Archiv. für Laryngol.," vol. xxviii, Part I.

The writer describes a case of bronchial carcinoma of the left lung, in which, by a combination of contraction and tumour-formation, there resulted an unusual variety of displacement of the larynx and trachea. While the trachea, especially its lower end, was drawn over to the left side, the larynx was not only displaced towards the right side, but pushed upward toward the hyoid bone, and rotated on its long axis somewhat to the left.

Experimental researches carried out on the dead body showed that moderate displacement of the lower end of the trachea affected the trachea

alone, the larynx remaining in its normal position in the mid-line. Marked displacement affected the larynx only to a slight degree, and in such a way that its long axis assumed a somewhat oblique direction, and the plane passing through the upper margins of the thyroid cartilage came to be inclined at a greater or less angle to the horizontal. It was, however, not found possible to reproduce experimentally a dislocation of the larynx across the mid-line towards the side opposite to that to which the lower end of the trachea was displaced, that is, the variety of dislocation present in the case reported. In order to produce such a displacement it seems to be necessary that the trachea be displaced laterally and pushed upward, and that its walls possess a considerable degree of rigidity, such as the trachea of the dead body, owing to loss of muscular tonus and collapse of blood-vessels, does not possess. The *post-mortem* examination in the writer's case showed that, owing to the considerable development of tumour masses in the upper lobe of the left lung, the trachea had been pushed upward and to the right as though it were being thrust out of the thorax.

The author, on anatomical grounds, regards a dislocation of the larynx towards the opposite side as impossible in a case of uncomplicated aortic aneurysm, such as that reported by Curschmann. He also questions the possibility of a variety of displacement described by Curschmann as occurring in certain other cases, in which the laryngo-tracheal tube as a whole is said to be drawn or pushed to one side in such a way that its axis runs parallel with the mid-line. The author never succeeded in producing experimentally such a displacement, and regards it as inconsistent with the mode of attachment of the laryngo-tracheal tube.

Thomas Guthrie.

THYROID GLAND.

Pern, S.—Some Congenital Abnormalities of the Thyroid Gland
"Australian Med. Journ.," June 21, 1913.

Pern states that heredity has an enormous influence in the production of thyro-toxic goitre. A marked diversity of type occurs, from typical Graves's disease to thyroid insufficiency. In a few generations of goitre some of the children are born with degenerative goitres, or even become cretins. A deficiency of lime in the system is largely productive of the symptoms of thyro-toxic goitres of the type found in Graves's disease, the administration of calc. lact. has a most beneficial effect. For the degenerative type thyroid extract is the remedy.

A. J. Brady.

EAR.

Frey, Hugo.—A Contribution to the Anatomy of the Temporal Bone.
"Archiv. f. Ohrenheilk.," Bd. lxxiii.

The author confines himself chiefly to a minute consideration of the sutural relations which exist between the squamous portion and the rest of the temporal bone, and endeavours to simplify as well as add to the existing nomenclature used in the descriptive anatomy of this bone. His investigations are based on a study of the anatomy of the temporal bone (1) of an infant, (2) of a youth, and (3) of an adult. He has also derived help from a temporal bone in his possession, the squamous portion of

which can be disarticulated from the rest of the bone without artificial means. The conclusions arrived at may be briefly summarised as follows: Extending downwards from the linea temporalis there is a more or less triangular portion of the squama which is applied to the facies mastoidea of the petrous bone and helps in the formation of the mastoid process—the appendix mastoideus squamæ.

The facies mastoidea of the petrous bone is continued towards the aditus ad antrum as a triangular field which forms the substructure of the posterior wall of the external auditory meatus. It ends internally in a small tuberosity—the tuberculum antri.

A more or less pronounced vessel groove runs across the processus articularis—sulcus articularis.

The pars squamosa is united to the pars petrosa by a squamous suture. Its visible edges may be called fissuræ petrosquamosæ and have the following subdivisions: From the incisura parietalis to the internal angle between the petrosus and squamosus F. petrosquamosa interna. From this point to the medial end of the F. tympanosquamosa (lateral end of pars fissura tegmen tympani)—F. petrosquamosa externa anterior.

The F. petrosquamosa ext. post. (pars meatus) begins where the tympanic edge of the squama is applied to the prominentia epitympanica (Spee) and extends to the apex of the appendix mastoidea squamæ. The pars mastoidea of this fissure extends from the latter point to the incisura parietalis. The latter is identical with what is known as the F. mastoideosquamosa. The pars tympanica unites with the pars fissuræ tegm. tympani, and is only separated from it latterly to a small extent by the F. petrotympanica (F. Glasseri). The outer part of its anterior limb unites with the pars squamosa, F. tympanosquamosa ant. (otherwise known as the F. tympanosquamosa). The upper edge of the posterior wall of the pars tympanica forms, by applying itself to the squama, the F. tympanosquamosa post. (at present known as F. tympanomastoidea). This fissure, however, corresponds in part with the pars meatus of the F. petrosquamosa externa post., which should always be implied when the former is mentioned, the name F. tympanosquamosa being sufficient without any addition to designate the above-mentioned F. tympanosquamosa ant. To fully appreciate this work it would be necessary to read the original article and consult the accompanying figures.

J. B. Horgan.

Law, Fred. M.—Radiography as an aid in the Diagnosis of Mastoid Disease. "Annals of Otolology, etc.," xxii, p. 635.

In a short paper the author demonstrates that a radiograph of the mastoid will show—the size and extent of the mastoid cells; the presence of pathological material; sometimes the presence of sclerosis; the presence of cholesteatoma; the approximate size and position of the lateral sinus and emissary vein.

MacLeod Yearsley.

Stewart, Wm. H.—Radiographic Findings Illustrating the Anatomic Development of the Mastoid Bone. "Annals of Otolology, etc.," xxii, p. 678.

The results of Stewart's investigations have been partially successful in demonstrating—(1) that we frequently have distinct and well-formed pneumatic cells as early as two years. (2) That there is a wide variance in the character, location, and extent of the mastoid cells under ten years. (3) That given six children of any age, say five years, no two will have

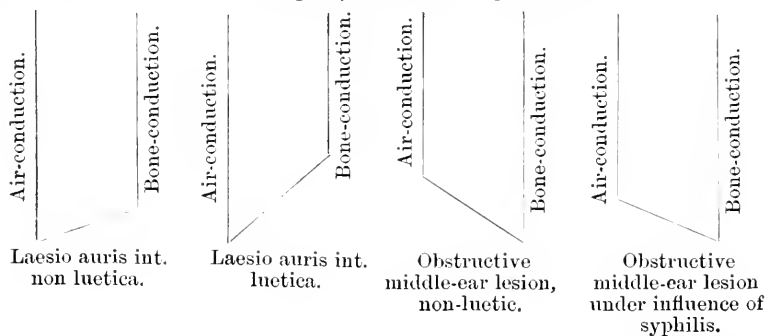
mastoids alike. (4) That the generally accepted view that the cells are of the same character on both sides is not true in all cases—the authors' experience with the normal will show that while the majority have a great similarity on both sides, in about 15 per cent. there is considerable variance in the character. (5) That the mastoid cells of the pneumatic type may extend into the occipital bone back of the sigmoid portion of the lateral sinus; into the squamous portion of the temporal; and above the external auditory canal to the root of the zygoma. (6) That with a fairly intelligent child the radiographic examination will clearly show the character and location of the mastoid cells in their relation to the lateral sinus, the external auditory canal and the tegmen tympani. The paper is illustrated by nine plates.

Macleod Yearsley.

Beck, Oscar.—Bone-conduction in Syphilis. “*Monats. f. Ohrenh.*,” Year 47, No. 8.

This is a readable and concise article on certain phenomena which have been observed and investigated by the author.

Beck has noted that it is very common to find the bone-conduction much shortened in syphilis during the “secondary” period of the disease. A table is published illustrating this point by comparative observation on both luetic and non-luetic aural lesions taken without selection, and he graphically records his findings by the following diagrams.



Two cases reported are most striking. A young girl came to the clinic complaining of fever, headache, and pain in the ear of some days' duration. Membrana tympani red and swollen and postero-superior quadrant bulging; other details obscured. Weber to the affected side, where also the range for speech was much reduced: Air-conduction almost normal, and bone-conduction certainly not lengthened. Diagnosis made: Otitis media suppurativa acuta, most probably luetic. Syphilis was admitted and Wassermann proved positive. The fact that with an acute middle-ear lesion the bone-conduction was not lengthened was one of the main reasons for giving this diagnosis. Beck contends that a shortening of bone-conduction must have existed in this ear before the onset of the middle-ear affection, and that the lengthening of bone-conduction due to middle-ear involvement had in this case made a really shortened bone-conduction appear as normal.

An engineer was sent to him for examination of the ears prior to an injection of salvarsan—a primary lesion had been diagnosed on the finding of spirochaetes. Wassermann, however, was negative, and no glandular or other signs could be detected. Since the bone-conduction on each side was much reduced with otherwise normal ears Beck regarded the case as

one in which general infection had already taken place, although this was not the view of the dermatologist who had sent the patient. The man was treated with salvarsan and mercury for half a year without any symptom appearing, but the bone-conduction remained shortened, and very soon a papular eruption appeared on the lips and tonsils. The Wassermann now gave a positive result. Beck has never found salvarsan and mercury cause an alteration in this shortened bone-conduction.

It is not easy to determine the solution of this symptom. At first he had supposed it to be in relation to the blood-pressure, but this was found inaccurate. He thinks, however, there is good reason to suppose that it is associated with an increased pressure of the cerebro-spinal fluid, and has noted that, with the exception of one case, the effect on the shortening—i. e. restoration—of bone-conduction could be demonstrated some three hours after the removal of, on the average, six cubic centimetres of fluid. He suggests that this rise of pressure in the cerebro-spinal fluid may also account for the increase in the skin and tendon-reflexes which occurs in connection with syphilitic exanthemata; although it is further remarkable that the amount of the shortening of bone-conduction will at times vary on the two sides in the same patient, as the following case illustrated: A housemaid, aged twenty-five, with a positive Wassermann reaction and a history of primary affection three weeks previously. The membrum tympani and middle ear were normal on each side, but the bone-conduction, as estimated by the electrical tuning-fork devised by Urbantschitsch, was about twice as long on the left side compared with the right. The reflexes on the left side were markedly increased. In this patient, therefore, the decreased bone-conduction on the right side—that is, the side on which the intracranial pressure was greater according to this hypothesis—was associated with an exaggeration of the reflexes on the contralateral side, a circumstance that would tend to support this theory of the causal relation of raised pressure within the skull and shortening of bone-conduction.

The electrical tuning-fork alluded to is an instrument which has apparently already been demonstrated in Vienna, and which enables the amount of bone-conduction to be accurately compared and recorded.

Alex. R. Tweedie.

MISCELLANEOUS.

Harmer, Douglas.—The Treatment of Inflammatory Conditions in the Upper Air-Passages by Vaccines. "Proc. Roy. Soc. Med.," March, 1914, Med. Sect., p. 103.

From a discussion on "Vaccines from the Standpoint of the Physician." The author finds that some people are very sensitive, and reactions, both general and local, are more frequent than is generally supposed. The introduction of sensitised vaccines enables large doses to be given, which are necessary in the more acute infections. In acute streptococcus infection doses of 100, 500, and 1000 million can be given on three succeeding days. Good results are got in cases of acute streptococcus infection. The pneumococcal cases are disappointing, perhaps because of the varying strains of pneumococci; also the pneumococci are difficult to sensitise.

Colds, pharyngitis and laryngitis are usually due to combined infection with pneumococcus and catarrhalis or pneumococcus and influenza.

In fourteen cases treated with influenza and pneumococcus vaccine, definite improvement was noted in eight, and in fifteen cases treated with pneumococcus and catarrhalis, improvement was got in eleven.

In chronic sinusitis streptococcus and Friedländer vaccines gave good results; pneumococcus, influenza, staphylococcus, and coliform organisms were valueless. Two cases of sinus suppuration treated with sensitised streptococcus vaccine are mentioned. The first was cured with three injections after suffering from purulent discharge from the antro- and fronto-ethmoidal cells for many years. The second, suffering from pansinusitis, had had repeated operations on her septum and nasal sinuses; after two doses the discharge was very much lessened.

Friedländer vaccine was of no curative value in fourteen cases of atrophic rhinitis treated for varying periods.

The results of immunising vaccines before operation to avoid high temperature, septic wounds, etc., have been good.

The author then draws attention to the dangers of vaccines. Some patients are very susceptible to influenza vaccines, which are often very depressing. He knows of no case which was made permanently worse by inoculation.

Raymond Vétel.

Jouty, Antoine.—**Hypertrophy of the Thymus Glands in a Child, two and a half years old; Thymectomy, Suppurative Mediastinitis, Recovery.** "Annales des Mal. de l'Oreille, du Larynx, du Nez, et du Pharynx," vol. xxxix, No. 7.

January 17, 1912, a child was seen by the author suffering from noisy dyspnoea. The mother gave the following history: Three months previously he became hoarse and shortly afterwards developed a croupy cough with spasms resembling pertussis. During deglutition fluids frequently passed the wrong way, but not so solids. Dyspnoea set in and had been almost continual since. Now the child was sometimes awakened in a state of suffocation. General health good. Nothing of note in the family or personal history. There was evidence of a well-developed collateral circulation at the upper part of the thorax. Breathing was attended with inspiratory stridor and slight parietal recession. No cyanosis. Indirect laryngoscopy was impossible. The direct method by Killian's tube-spatula revealed contraction of the adductors and tensors of the cords.

As the condition of the patient became threatening, tracheotomy was performed without further investigation. Breathing became free directly the cannula was introduced. The dyspnoea was therefore ascribed to glottic spasm, probably the result of enlarged tracheo-bronchial glands. Some days subsequently dyspnoea recurred, but it was expiratory as well as inspiratory; slight at first, it went on increasing until on the twelfth day the condition of the patient became alarming. Inferior tracheo-bronchoscopy was attempted but failed, for as soon as the tube was introduced a suffocative attack came on even after preliminary swabbing with cocaine. The author now considered an enlarged thymus might be responsible for the trouble. During the tracheotomy he remembered having seen a piece of gland-like tissue come into view during an expiratory effort, which at the time was supposed to be an enlarged lymphatic gland; this might have been the upper pole of the thymus. On deeply palpating the supra-sternal fossa with the index finger resistance was felt. Thymectomy was now performed under local anæsthesia. The gland removed, the child breathed normally. The cervico-thoracic wound was sutured and the tracheal tube retained for safety. On the following days, though breathing freely, the patient continued to cough and expel

large quantities of mucus through the cannula and tracheal wound. The cervico-thoracic wound became infected, necessitating immediate removal of the sutures. At each expiratory effort pus welled up from the retro-sternal space. Suppurative mediastinitis had been set up. To facilitate drainage the child was placed in an inclined position, and irrigations with peroxide of hydrogen were carried out with a glass tube, six times daily. Suppuration gradually subsided and ceased after twelve days. The operation wound closed well. The tracheotomy tube was worn two months longer and then withdrawn. The writer observes that this case is interesting in that it clearly demonstrates the mechanism of dyspnoea during the evolution of thymus hypertrophy. Dyspnoea was primarily due to glottic spasm induced by irritation of the recurrent nerves, and later to tracheal compression. In this case it would have been preferable to have removed the thymus gland at once without a preliminary tracheotomy. Mediastinal infection would thus have been avoided.

H. Clayton Fox.

Wachter, H. (Erlangen).—A Case of Multiple Plasmacytoma of the Upper Air-passages. "Archiv. für Laryngol.," vol. xxviii, Part 1.

The patient, a woman, aged forty-eight, had suffered at intervals during a period of ten years from hoarseness and nasal obstruction due to a number of separate tumour-masses situated at various points in the upper air-passages. The growths were found in both nasal cavities, on the posterior surface of the soft palate, on the left Eustachian cushion, and on the left ventricular band. They displayed a marked tendency to recur after removal, but never exceeded a cherry in size. All the tumours were covered by normal mucous membrane, showed no tendency to break down, or to form metastases. They consisted of masses of plasma-cells, the great majority of which possessed one excentrically situated nucleus and a basophile granular protoplasm. The cells were embedded in a regular connective-tissue stroma with rectangular meshes.

The patient's general health remained unaffected and the lymphatic and hæmatopoietic systems showed no departure from the normal.

Two somewhat similar cases have been reported by Birt and von Werdt.

Thomas Guthrie.

REVIEWS.

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. By ROSS HALL SKILLERN, M.D. Philadelphia and London: J. B. Lippincott Company. Price 18s. net.

This painstaking work on the nasal sinuses in health and disease is well worth studying. But the student must prepare to wrestle, at times, with the author's meaning, especially in the anatomical descriptions. The following citation, for example, is not modelled with the precision of the "Gray's Anatomy" of our youth. "The ostium of the [sphenoidal] sinus is situated in the nasal portion of the wall, usually in the upper third and seldom *below the median line* (Fig. 223). Whether it lies close to the nasal septum appears to depend largely upon the depth of the sphenothmoidal recess, as the deeper the recess the further *away from the median line* it seems to find its location." (Italics ours.) There is no

indication here of the meaning of the expression "the median line," but if the author has the median line of the body in his mind we do not understand how a spot can lie below it.

Apart from carelessness of expression we have no fault to find with the anatomical sections of the book. Indeed, they are thoroughly detailed, and supply us with a vast amount of information, all of it of practical importance.

The plates and numerous illustrations generally are for the most part helpful and reliable, but Fig. 97 gives an inaccurate idea of the position of the incision in the radical operation on the maxillary antrum through the canine fossa. All the figures illustrating this operation indeed place the antrum too low, and so ignore the chief difficulty of the operation, that, namely, which comes from working within the limits of a confined space.

In all other respects, however, the book is a welcome and creditable contribution to the library of rhinology.

Dan McKenzie.

Die Städtische Ohrenklinik Frankfurt a. M. Von Prof. Dr. OTTO VOSS Mit 40 Abbildungen im Text, und 6 Plänen. Würzburg: Curt. Kabitsch, 1913. Price 3m.

A description of one of Germany's municipal clinics, calculated to engender a feeling of "divine discontent" in the minds of British readers. A special room for hearing-tests, isolated from the noisy world without; a special room for vestibular tests; the latest improvements in microscopic and micro-photographic apparatus; wards, public and private with sunny loggie—in short, a clinic of "the land where the dreams come true"!

We congratulate Prof. Voss upon his brochure, which is excellent, upon his clinic, which is perfection, and upon the enlightened public spirit of his nation, which makes such perfection possible.

Dan McKenzie.

NOTES AND QUERIES.

Among the recent recipients of birthday honours we are pleased to see the name of Dr. W. Milligan, of Manchester, as receiving the honour of knighthood.

As our readers are well aware Sir William Milligan has long been connected with the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, and we have much pleasure in extending to him our heartiest congratulations upon this well-deserved recognition of his professional eminence.

We are very pleased to note that Sir StClair Thomson has been elected a Honorary Fellow of the American Laryngological Association.

BOOK RECEIVED.

Geschichte der Nasenheilkunde von ihren Anfängen bis zum 18. Jahrhundert. Von Dr. med. Karl Kassel (Posen). I. Band. Würzburg: Curt Kabitsch, 1914.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

THE SEMON LECTURE, 1914.

(Delivered on May 28th, 1914.)

SUSPENSION LARYNGOSCOPY AND ITS PRACTICAL USE.

BY PROFESSOR GUSTAV KILLIAN,
University of Berlin.

Translated by Dr. D. R. PATERSON.

(Continued from p. 360.)

Morphine-Scopolamine Narcosis.

To produce this state of narcosis one proceeds as follows: Two hours before suspension the patient is given a centigramme of morphine and three decimilligrammes of scopolamine. An hour later the same quantity of both substances is injected. The operation room is darkened and quiet obtained so that the patient may fall asleep. It is not always successful with this dose, but deep sleep is not altogether necessary. The patient stands the operation quite well even if he is merely drowsy. One can carry on a conversation with him and give directions which he readily follows.

I would point out that with scopolamine and morphine cocainisation of the larynx is by no means superfluous. As a rule, the cocaine brush should be passed several times into the larynx, especially in the tuberculous. I generally have the patient lying on the operating table with the head moderately bent back, and

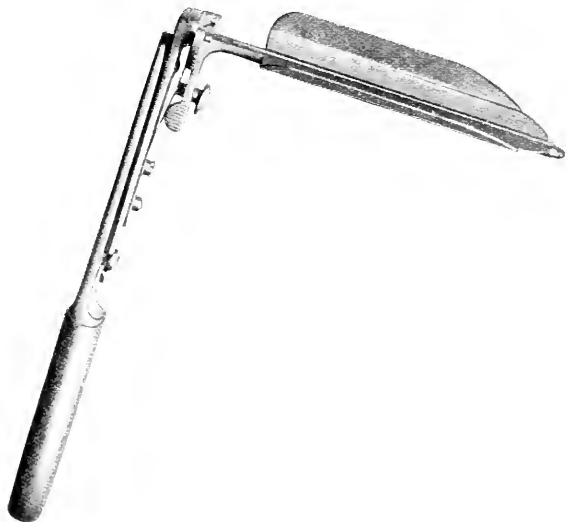


FIG. 27.—Handle for tongue-spatula. Each tongue-spatula can be tried beforehand with this handle.



FIG. 28.—Braun's bellows apparatus for general anæsthesia.

using the electric frontal mirror, I brush the larynx under the guidance of the laryngeal mirror. It is helpful in doing this to have the under jaw pulled forwards as it facilitates the view into the larynx and it is easier to introduce the brush. With morphine and scopolamine it is not necessary to use so much cocaine as both substances materially diminish the sensibility of the larynx. The examination should not be begun in any circumstances earlier than two hours after the first injection, otherwise many patients get into a peculiar condition of excitement and often resist. One can well wait longer—2½ to 3 hours—as the action of morphine-scopolamine lasts for some hours.

Preparation of the Instruments.

Before beginning the examination all the necessary instruments are arranged in order and inspected. The operator ought to make himself sufficiently familiar with the suspension hook and its mechanism. A tongue spatula of suitable length is fitted to the hook and the counterpressure apparatus fixed above. The gag is adjusted to the minimum distance. Before the introduction the mouth spatula is so arranged that it forms a gutter. An inclination towards the tongue spatula is given to the hook by turning the thumb-screw. It is inclined so that the end of the spatula hook comes to lie perpendicularly over the point of the tongue spatula. In this form the instrument should be introduced.

The patient lies flat upon the operating table. The body is drawn up so that the head projects free over the edge of the table. It is held in this position by the head support.

The cocaineising of the larynx, especially of the epiglottis and also of the posterior pharyngeal wall and of the tongue, follows. If these parts are sufficiently insensitive, the spatula hook is taken and the head is depressed somewhat by lowering its support.

Introduction of the Tongue Spatula.

This procedure is easily learned. Those skilled in the practice of the direct method will find no special difficulty. Our task is to pass the spatula under illumination to the posterior pharyngeal wall and then to move it down to catch the epiglottis safely. The introduction of the spatula is facilitated by pulling out the tongue and holding it. This is, however, not absolutely necessary. The tongue spatula readily pushes the tongue downwards if it is not fixed, so that it is well to have it pulled out to enable it to be seized and held.

In introducing the spatula, an endeavour is made to keep exactly to the middle of the tongue. If the epiglottis is seen one glides over it and lifts it upwards. This tilting movement is so made as not to cause the instrument to slip out, its object being to expose to view the arytenoid region and the interior of the larynx. If this is successful an assistant must so arrange the gallows that the hook can be suspended from its horizontal arm.



FIG. 29.—Introduction of the suspension-hook.

It is only when this stage is reached that the mouth-gag is set in action. Its stop is pushed over the teeth of the upper jaw, the bar fixed and then screwed up as far as the patient's mouth can be opened.

The complete view of the interior of the larynx is only possible when the head support is screwed so far down that the head hangs freely on the tongue spatula. For a more detailed view it is essential to turn the thumb-screw of the spatula hook in the

direction of a watch hand. The hook itself will then incline still further towards the spatula.

The anterior commissure usually comes into view only when pressure is made upon the cricoid. We press tentatively with the hand and then apply the counterpressor. This is accordingly

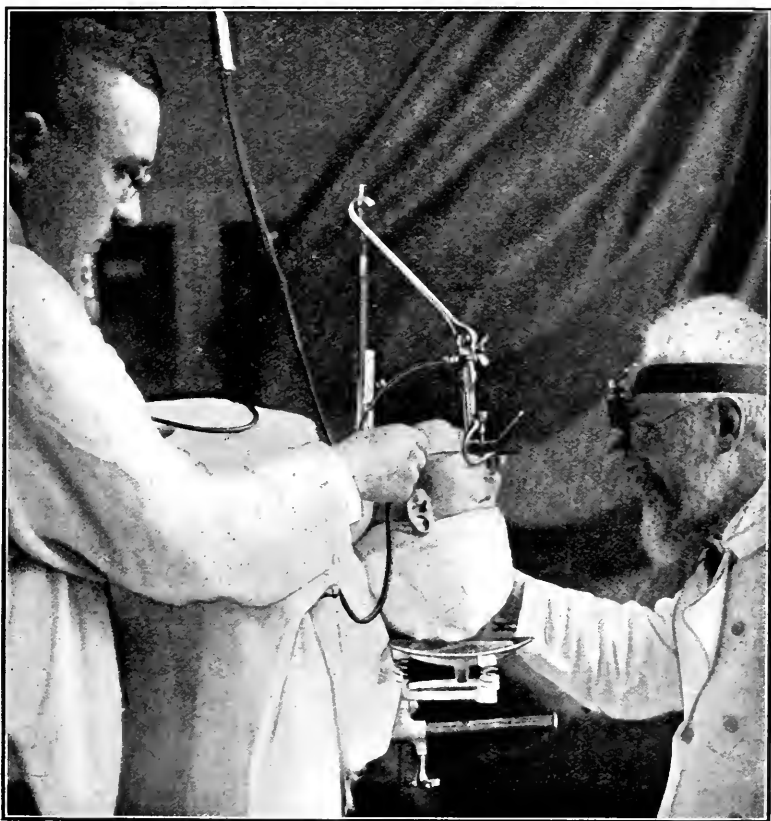


FIG. 30.—Suspension laryngoscopy.

brought down and so lengthened that its plate rests upon the cricoid region. This can be done by turning the screw and making the desired pressure.

If all these manipulations are carried through successfully the interior of the larynx is revealed to view and remains so as long as desired.

The view of the larynx can be achieved in two movements. The tongue spatula is first introduced over the tongue up to the epiglottis, the hook suspended, the gag put in position, and the

head brought into free suspension. This satisfactorily done, the narrow epiglottic elevator is introduced, pushed well down under the epiglottis and tilted up. The elevator is then fixed with the position screw. If the larynx is in view, the operating table is so adjusted that one can see comfortably, sitting or standing.

If the view of the larynx with the tongue spatula and the suspension hook is successful, the patient is in a situation which can be best understood from an illustration. It is seen that one limb of the suspension hook which carries the tongue spatula is vertical, the second limb being inclined obliquely backwards. It is easy to understand how the tongue spatula hooks itself in this way deep in the pharynx, a position which prevents it from slipping out. The position is excellently shown on skiagrams taken from the side with the instrument *in situ*.

Certain objections have been advanced against suspension laryngoscopy. Many believe it to be a painful procedure. I can, however, easily show that pressure on the tongue alone is well borne by patients, and that even the fully introduced spatula produces hardly any discomfort. In order to convince themselves of this, two specialists—Hopmann, of Cologne, and Seiffert, of Breslau—submitted themselves to suspension laryngoscopy. They experienced only an uncomfortable pressure against the teeth and some tension in the region of the faucial pillars. Where the spatula has remained in position one may notice sometimes in the next few days here and there on the epiglottis a small pressure mark, which soon disappears.

*The View of the Buccopharyngeal Cavity and of the Larynx
in Suspension Laryngoscopy.*

The new method shows the larynx in general very much as we are accustomed to see it in the direct method. An essential difference is that a complete view is obtained over the whole larynx, pharynx, and mouth cavity. The immediate neighbourhood of the larynx projects more plainly, the pyriform sinuses gape, whilst the arytenoid region and even at times the beginning of the cricoid plate come forward from the vertebral column. The laryngeal interior appears extended slightly in length in a sagittal direction. The cords are somewhat less freely movable. On deep inspiration a part of the anterior tracheal wall may be seen whilst the epiglottis is covered by its spatula. By lessening the inclination of the head a further extent of the trachea may be seen.



FIG. 31.—The view in suspension laryngoscopy.
The epiglottis exposed.



FIG. 32.—The view in suspension laryngoscopy.
The larynx exposed.

TO ILLUSTRATE PROFESSOR GUSTAV KILLIAN'S PAPER ON SUSPENSION LARYNGOSCOPY AND ITS PRACTICAL USE.

The whole topography of the pharynx and larynx can be taken in simultaneously at a glance, and is so easily intelligible that even a layman can make it out. There is no difficulty in the access of instruments to particular parts. Although the intra-laryngeal manipulations naturally demand a certain amount of practice, this is not in the least to be compared with that required for indirect laryngeal work.

V. PRACTICAL APPLICATION OF SUSPENSION LARYNGOSCOPY.

Demonstration.

The new method lends itself excellently to the demonstration of the interior of the larynx and its pathological alterations to a large circle of students. The demonstrator has practically nothing to do provided the illumination by the small lamp is sufficient. He can stand quietly by and give the necessary explanations. Pathological conditions can be easily seen and correctly interpreted by the students. As specially suited for demonstration I would recommend laryngeal polypi, papillomata, slight cases of tuberculosis and even recurrent paralysis.

Minor operations can also be shown as, for example, the removal of a polypus or curetting.

Compared with the tiresome demonstrations with the mirror the progress made is very welcome. It is a pleasure to put a probe into the hand of a student and ask him to touch a particular spot with it. If the anæsthesia of the larynx is sufficient, it is always successful.

It has been thought by many that with suspension laryngoscopy, operative treatment may pass out of the hands of the laryngologist. I have no such fear. One must be a laryngologist to be able to recognise the correct indications for employing the method. Whoever would use it with success must be familiar with the anatomy, physiology, and pathology of the region as well as with its examination.

Clinical use of Suspension Laryngoscopy.

Notwithstanding the short time since its introduction the new method has been used frequently with the best results, not only by myself and my pupils but also by a large number of laryngologists in various countries, as the bibliography testifies.

From the point of view of diagnosis it is of value, especially in childhood, and, indeed, in all cases where the simple, direct

method is made use of. The only contra-indication here is marked dyspnœa. With some practice the introduction of the spatula in children can be done very quickly, and even in difficulty of breathing the larynx can be exposed to view (tracheotomy instruments should, of course, be at hand). With the larynx in sight immediate tracheotomy is no longer necessary in dyspnœa, as a tube of suitable calibre can be passed through the glottis. Seiffert has also pointed out that artificial respiration can be done with the suspension hook in position.

A whole series of affections of the larynx in children come up for diagnosis, especially where the cause of changes in the voice and breathing has to be determined. There may be revealed a simple acute or chronic catarrh, a subglottic swelling or false membrane, a croupous or diphtheritic affection, or node formations on the cords, papillomata, tubercle, syphilis, perichondritis, or a foreign body. It is of value in congenital defects of the larynx and in cases of difficult decannulation.

It gives information on the condition of the hypopharynx. It can be further used in small children in preparation for tracheotomy, bronchoscopy, as well as œsophagoscopy. If the tongue and epiglottis are held up with the spatula, the tube may be introduced easily and carefully, and this may be repeated without much harm. Before such manipulation the larynx should be slightly cocaineised, even where the child is under a general anæsthetic. If this is not done passing the tube is apt to induce a stoppage of breathing from irritation of the pneumogastric nerve, which may be overcome by artificial respiration.

The literature already contains a large number of clinical reports upon the use of suspension laryngoscopy in children. They refer mostly to papillomata, vocal cord nodes and foreign bodies.

Laryngeal Papillomata in Children.

Of late we have had many opportunities of removing by suspension laryngoscopy recurrent papillomata in small children. Albrecht has written fully on this subject and has reported a number of cases. From the fact that papillomata often recur even after thorough removal, it frequently happened that the same child had to be repeatedly subjected to suspension laryngoscopy. Although many children had considerable dyspnœa when placed on the table, nothing untoward ever occurred.

The larynx of the child is so accessible in suspension laryngoscopy that the papillomatous masses are readily seen. They can be removed entirely in one sitting and tracheotomy thus avoided, in certain circumstances. For the removal we use a narrow double curette rounded anteriorly, which can be supplemented by the sharp spoon. The larynx is then brushed lightly with a 1 per cent. salicylic acid in spirit. To prevent recurrence we have found the administration of iodide of potash and arsenic of good service.

It appears to me that recurrence is best prevented by radium or mesothorium. Polyak and I had already proved that radium caused the disappearance of laryngeal papillomata, and lately, favourable reports of it have come from Chiari's clinic. With the larger quantity of radium or mesothorium now available, papillomata have, as a matter of fact, been caused to disappear. In future they ought to be removed in suspension laryngoscopy and a mesothorium capsule immediately introduced into the larynx. For further particulars the papers of Albrecht, Wolff, Klestadt, Mann, Katzenstein and Seiffert should be consulted. Albrecht has succeeded in permanently freeing the larynx from papillomata in a number of children. Kahler observed by suspension laryngoscopy in a child, aged three and a half, numerous papillomata in the hypopharynx and the entrance of the gullet, which were easily removed.

Vocal Cord Nodes in Children.

In small children who cry a great deal, small nodes not infrequently develop on the vocal cords and lead to persistent hoarseness. They are usually associated with slight chronic catarrh. They are mostly found in children who, in consequence of hypertrophy of the pharyngeal tonsil, thickening of the inferior turbinate, as well as septum deviation, etc., suffer from deficient nasal breathing. The direct method under a general anæsthetic is used for diagnosis. Suspension laryngoscopy is here well adapted, as Seiffert and Katzenstein have pointed out, the nodes being easily removed by it.

Tubercle, Syphilis, Difficult Decanulement, etc., in Childhood.

Though tubercle in the larynx in children is very rare we have observed it and in suspension laryngoscopy curetted it. No case of syphilis has been recorded.

With regard to difficult decanulement the condition of the sub-

glottic space and of the trachea has to be examined and granulations removed if necessary. For this purpose it may be necessary to pass a tube through the glottis. This I have done and Seiffert has reported a similar case.

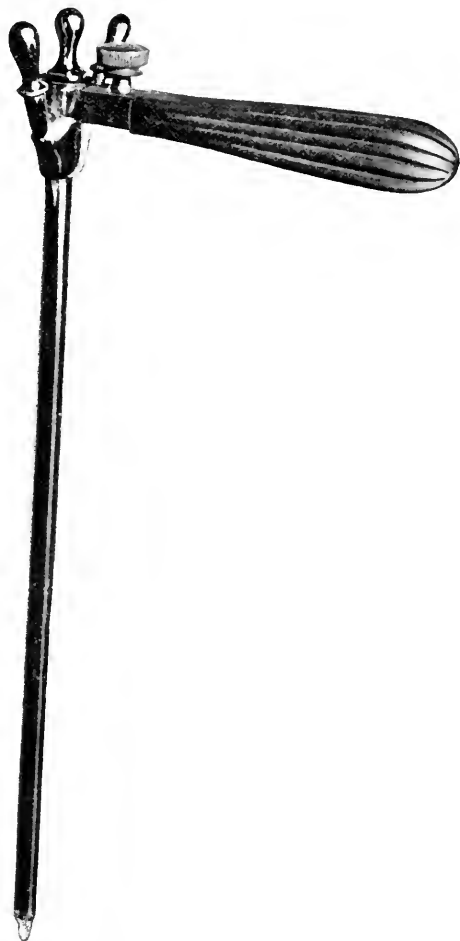


FIG. 33.—New three-channelled tube for bronchoscopy in children.

In this connection a word may be said on the use of suspension pharyngoscopy. If a broad spatula, which does not extend far down, be attached to the suspension hook the pharynx is very easily made accessible in small children and operations can be performed, such as tonsillectomy. Albrecht and I, as well as Freudenthal, have done it in small children under general anaesthesia. With the head dependent, the tonsil is seen upside down. Its upper pole is below and the technique of extirpation

must be modified accordingly. The blood will run into the nasopharynx and disturb less. Bleeding may be controlled by compression or by artery forceps and clips.

Foreign Bodies in Children.

Experience of the removal of foreign bodies by means of suspension laryngoscopy from the pharynx of small children is

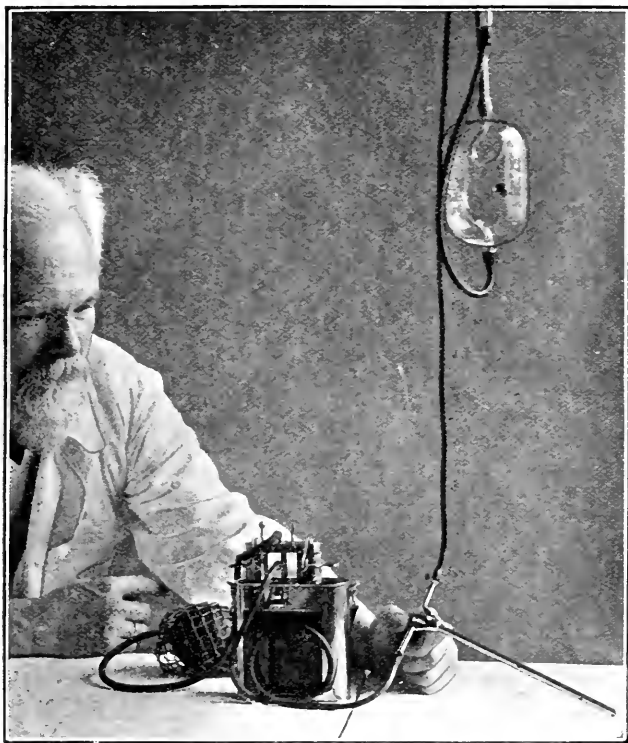


FIG. 34.—Three-channelled tube attached to Braun's anæsthetic apparatus and to water air-pump.

still somewhat limited, but nevertheless very encouraging. Davis appears to have been the first to remove, in a child eleven months old, a safety-pin from the pharynx. My assistant, Weingartner, recently extracted in a similar manner a piece of bone impacted in the entrance of the larynx and pharynx. Seiffert reports the removal of a flat bone from the subglottic space in a child five years of age, and Iglauder removed a portion of a safety-pin from the larynx, which had lain there five months. Both observers

agree that the diagnosis and extraction presented no special difficulty.

An important question is raised whether suspension laryngoscopy facilitates the introduction of the tube in bronchoscopy in young children. As difficulty is frequently met with in introduction, I exposed to view the larynx in two cases of foreign body,

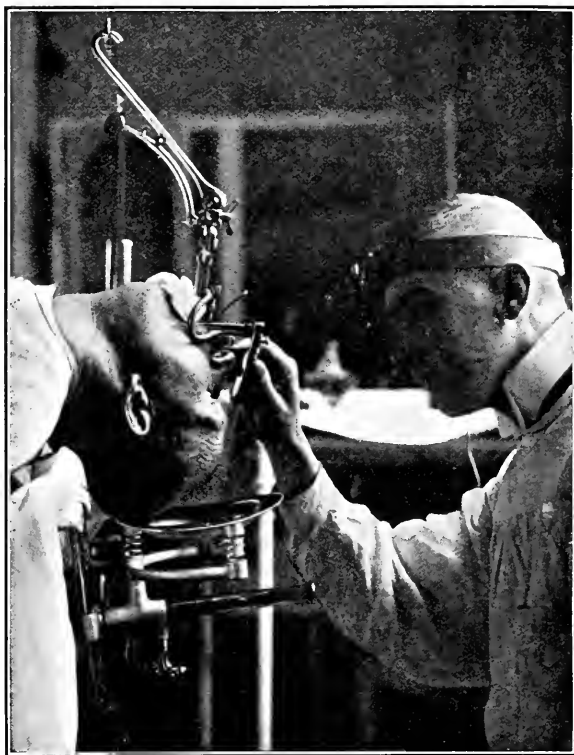


FIG. 35.—Suspension bronchoscopy.

cocainised the laryngeal entrance, and then carefully passed the bronchoscopic tube down through the glottis. I succeeded [in removing with great ease a metal sheath from the right bronchus. In a similar manner I got from the left bronchus of a two-year-old child a nail which had lodged there for a year and had produced bronchiectatic suppuration. The bronchoscopic tube used on this occasion was of special construction. It had two fine lateral pipes, one of which extended to the end of the tube, and served for suction of secretions by means of a water pump; the second reached only half the length and enabled chloroform to be

given continuously during the bronchoscopy, thus keeping up an equable anæsthesia. It greatly facilitated the extraction of the foreign body.

Suspension Laryngoscopy in Adults. Tuberculosis of the Larynx.

The treatment of laryngeal tuberculosis has at all times given the laryngologist much anxiety and trouble. It was rarely possible to do much because a more vital organ than the larynx, viz. the lung, was generally affected. It was only when we learned to improve the condition of the lung by residence in a sanatorium that better results were obtained in the larynx. Whilst treatment formerly was more or less symptomatic, it later on assumed a more active form. An attempt was made to remove the affected parts in the larynx by operation, or to produce a cure by measures which destroyed the diseased tissue. On account of the great irritability of the phthisical patient this treatment was very troublesome, took up time, and caused the patient much discomfort and suffering. As only very little could be done in one sitting with the single or double curette it was always an unfulfilled wish to shorten the local treatment as much as possible. I have often felt it would be a great boon to the patient if the major part were done at one time. After treatment would be materially shortened and sanatorium treatment might be sooner begun.

Since the introduction of direct laryngoscopy operative treatment of the larynx has made marked progress. Curettage, as well as the deep puncture by the galvanocautery recommended by Grünwald, could be carried out with the greatest precision through the tube spatula. Something was lacking, however, which has now been supplied by suspension laryngoscopy. It has laid bare to the operator the whole laryngeal region. He could now work with both hands, using the curette and the mop at the same time. Patients were found to tolerate quite well in one sitting an extensive curettage and even deep puncture of an infiltration.

The outlook from the therapeutic point of view is now quite different. Sanatoria are accessible to the poor; the number of the tuberculous who get no appropriate treatment has much decreased and they no longer flood out-patient departments and consulting rooms.

For small tuberculous foci sanatorium treatment is sufficient. Definite infiltration, or ulceration, or extensive involvement of the larynx is removed in suspension laryngoscopy by curette or cautery and the patient then transferred to a sanatorium.

With regard to technique minor manipulations may be carried

out forthwith under a morphine injection and cocaine. For more extensive operations and in very irritable patients morphine-scopolamine narcosis is well adapted. The operator should have between the patient and himself a glass screen to protect against being coughed upon. The single curette, which can be rotated, is the best ; occasionally the double form is required.

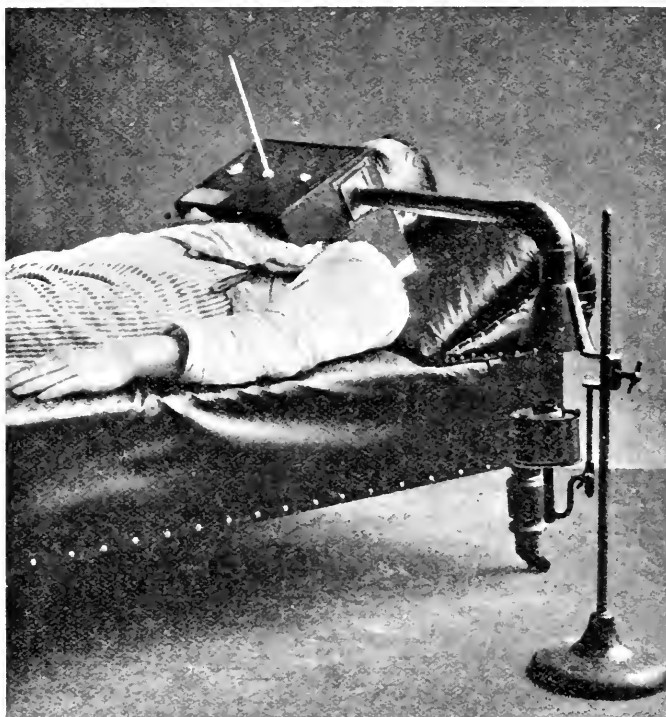


FIG. 36.—Albrecht's hot-air box for the neck.

With such active treatment I have never met any serious bleeding. If it should happen, the larynx is sufficiently accessible in suspension to apply an astringent or even a clamp. Blumenfeld arrested laryngeal hæmorrhage by means of a clip applied under the laryngeal mirror, and Fischer now makes instruments for fastening clips in suspension laryngoscopy. For disinfection of the parts after the operation iodoform or vioform may be insufflated.

This treatment is followed by reaction for a few days. The mucosa becomes injected and œdematous in places. The patient

should therefore be kept quiet and forbidden to speak so as to avoid increasing the reaction. In œdema, Albrecht's hot-air bath, which is useful in other laryngeal affections, is excellent. Hot air induces active hyperæmia of the larynx and leads to absorption of the exudation.

It is astonishing how clean the wounds and ulcers in the larynx look some days after the curettage in suspension. I have seen nothing like it hitherto, even after prolonged treatment. In favourable cases, the fresh surfaces soon cicatrise under lactic acid applications.

During the first few days, some pain in swallowing is complained of and there is almost always some rise of temperature similar to what is met in consumptives under the most varied conditions. But it very soon falls. As after-treatment, administration of iodide and the application of hydrogen peroxide, as suggested by Pfannenstiël, give the best results. Only after this should lactic acid be used. An early radical treatment has at times rendered tracheotomy unnecessary.

We have dealt with a number of patients in this manner, and others have reported very favourable results in laryngeal tubercle treated in suspension (*e.g.* Hölscher, Freudenthal, Seiffert, Kahler, etc.).

Brieger and his assistant Seiffert have already tried direct application of X-rays to the interior of the larynx—a treatment said to be promising.

Lupus of the larynx, especially its extensive form, is amenable to treatment in suspension laryngoscopy, and recently Simoleki operated on a scleroma in this way.

Benign Growths of the Larynx.

Although simple neoplasms are very easily removed under the mirror, suspension laryngoscopy will often prove of value in cases of difficulty. It is especially adapted for extensive growths. Much more can be attempted and carried out with greater precision. At times it will obviate the necessity of an external operation.

Removal of a polypus from the vocal cord is extremely simple and even the unpractised may perform it in suspension. Hölscher, Steiner, Chiari, and others report cases.

Cancer of the Larynx.

Suspension laryngoscopy ought to render important service in laryngeal cancer. In cases of difficulty, removal of a part for

examination will be facilitated. Very small growths and suspicious places have hitherto been removed under the mirror or through the tube spatula. Areas on the cords, on the epiglottis or on the aryepiglottic folds can be treated in this way. Suspension laryngo-

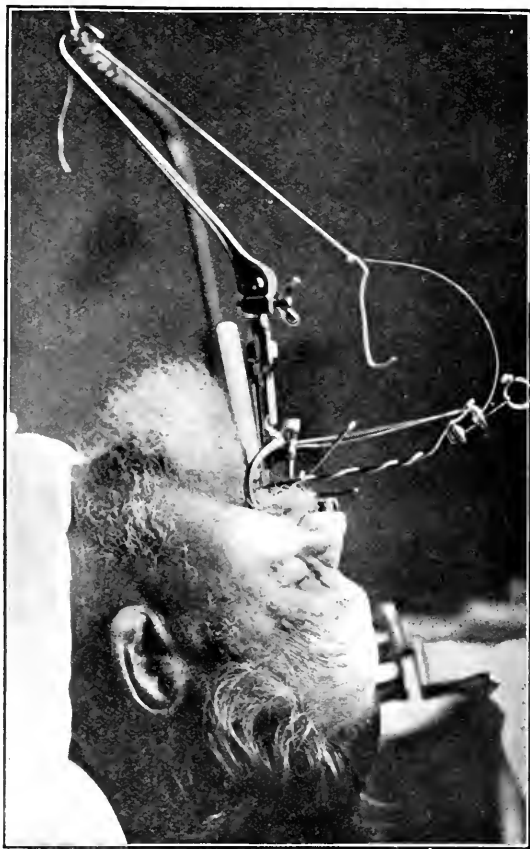


FIG. 37.—Application of mesothorium in suspension laryngoscopy.

scopy enlarges this field of usefulness, but the limits of intralaryngeal removal should be very definite. E. Meyer reports excision of a carcinoma from the epiglottis. Such cases, it is needless to say, ought to be selected with care.

In treatment by radium and mesothorium, suspension may present certain advantages for their introduction. I have treated a number of cases with mesothorium and tried various methods. Many tolerate it fairly well if the mesothorium capsule, fixed to a wire or to a slender rod, be introduced into the cocaine-treated larynx

and the wire placed between the teeth. As a rule tolerance for an hour or more presupposes favourable conditions. I have several times introduced the capsule after a morphine-scopolamine injection, the head being lightly supported during the seance, and found the patient able to bear it an hour to an hour and a half—a much shorter time than is given in gynæcology. The larynx reacted markedly during the first few days after the application especially if carcinoma were present and œdema sometimes appeared. It is well to avoid in the larynx a longer seance than an hour and a half.

A definite effect showed itself in each case. The carcinoma became smaller, but no cure resulted. The growth recurred and the gland metastases were unaffected. Carcinomatous glands should always be removed as they are uninfluenced by mesothorium. It appears to me that laryngeal cancer, even flat-celled epithelioma, is not nearly so hopeful as carcinoma of the uterus.

Kahler has used the suspension hook *before* external operation (laryngo-fissure or total extirpation) and has infiltrated the parts in the hypopharynx with cocaine and adrenaline. He claims it lessens hæmorrhage.

New Growths and Foreign Bodies in the Hypopharynx.

The hypopharynx is widened by the lifting up of the larynx and can be more easily dilated with a suitable instrument. Seiffert has suggested a special form of forceps. Impacted foreign bodies such as dentures can be extracted without difficulty. Œsophagoscopy is not materially facilitated by suspension. Seiffert records a case of removal of a lipoma from the hypopharynx.

Taking it all in all, we have in suspension laryngoscopy a method which renders excellent service under definite conditions and enlarges still further the limits of our diagnostic and therapeutic knowledge. May it in your hands accomplish still more !

A CASE OF PARALYSIS OF THE EXTERNAL RECTUS MUSCLE DUE TO THE PRESENCE OF AN ABSCESS IN THE APEX OF THE PETROUS PYRAMID. DEATH FROM BASAL MENINGITIS.

BY GEORGE WILKINSON, M.B., F.R.C.S.
Sheffield.

A BOY, aged eight, was brought to the out-patient department of the Sheffield Royal Hospital on February 17th last, complaining of

right-sided carache and inability to keep the right eye open. He seemed listless and poorly, did not play, and wanted to be kept quiet.

The following history was obtained from the mother: After having been out of sorts and feverish for a few days, he began to complain of earache about a month previously. He was kept in bed for a few days, during which time he was thought to be feverish, as he sweated profusely. There had been no sore throat and no discharge from the ear. The pain was severe, and was referred to the front of the ear and down the side of the neck. There had been no vomiting. About one week previously it was noticed that he constantly kept the right eye closed or covered with his hand.

On examination the boy was found to be somewhat deaf. Hearing for the watch: right ear 4/24, left ear 16/24. Bone-conduction, as tested with tuning-fork C₁, not shortened. The membrana tympani was normal in appearance. There was slight tenderness on deep pressure over the mastoid, and a slight amount of swelling of the tissues of the neck just below the apex of the mastoid.

The eye condition was found to be a pure right-sided external rectus paralysis. The eye was kept closed to obviate diplopia. The optic discs were normal in appearance. There was no spontaneous nystagmus and no disturbance of equilibration. Temperature, 99.4° F.; pulse, 96.

Though the symptoms referable to the ear seemed slight and rather indefinite, I was inclined to take a serious view of the case, and recommended that the boy should be admitted to hospital forthwith. The isolated involvement of the sixth nerve pointed, I thought, to a pachymeningitis at the base, probably associated with an inflammatory focus deep in the substance of the petrous bone.

The boy was given an anæsthetic the same evening. Paracentesis was done, but no pus was found in the middle ear. Lumbar puncture was also done. The fluid obtained was quite clear, and not under pressure. It reduced Fehling's solution. The mastoid was opened. It was of the "pneumatic" type, the cortex being very thin. The peripheral cells contained a gelatinous, slightly turbid muco-pus (this yielded, on culture, a pure growth of *Streptococcus mucosus*). The bone was but slightly softened and showed very little inflammatory reaction. The sigmoid sinus groove was opened and was found to be uninfected. The antrum was deeply placed and was free from pus. The mastoid wound was drained.

Four days later a discharge of muco-pus from the meatus began and lasted for about ten days. The mastoid wound appeared healthy but was kept open by the drainage-tube. The condition of the eye remained unchanged. The boy did not complain of any particular symptoms. There was no distinct headache and no vomiting. Still he was abnormally quiet and retiring, and showed a dislike for noise or bright light. His appetite was poor. His temperature ranged between 97° and 98° F., rising to 99° F. on the evenings of March 1, 2 and 3. The pulse was very variable, from 70 to 120 per minute.

The eye condition was reported on by Mr. H. Emmerson, who agreed that there was an uncomplicated external rectus paralysis and that the optic discs were normal.

The onset of what proved to be a very acute and rapidly fatal meningitis was first apparent on March 10, on which day he complained of headache, and vomited. Pulse 110, temperature 98°. On the 11th the temperature rose to 102°. Headache was intense. He vomited repeatedly. The neck was rigid, and the head somewhat retracted. He complained bitterly of any noise, and buried his head in his pillow to escape the light. Kernig's sign was well marked. The fluid withdrawn by lumbar puncture was turbid, did not reduce Fehling, and yielded, on culture, a pure growth of *Streptococcus mucosus*. He passed next day into a state of delirium, with frequent loud outcries. The temperature rose to 103° on the 13th and the pulse to 124. Coma supervened on the 14th, with a temperature of 105° and pulse of 160, and he died on the 15th.

Autopsy.—On removing the skull cap and brain there was found an extensive purulent basal meningitis. There was a large collection of pus in the left middle fossa (the side opposite the affected ear), which had compressed and flattened the temporo-sphenoidal lobe. Pus extended widely from the region of the sella, along the main sulci and downward along the base and sides of the medulla to the foramen magnum. The spinal canal was not examined.

On stripping the dura from the base of the skull, a thin layer of bone was detached from the apex of the petrous pyramid, disclosing a smooth-walled abscess cavity. No direct communication was made out between this cavity and the collection of pus within the meninges. The dura was loosened from the bone in the neighbourhood of the cavity and particularly at the back of the cella, and some pus was tracking beneath the dura in this situation, though no direct communication could be discovered between this

track and the large collection of pus in the right middle fossa. The brain was kept for further examination, and the left temporal bone with the adjoining part of the basi-sphenoid and basi-occipital was removed.

The cavity in the apex of the pyramid measured 16 mm. in its long diameter and 12 mm. from above downwards. The carotid artery was exposed for about $\frac{1}{2}$ in. in the anterior wall. Externally and posteriorly the cavity was bounded by the compact bone enclosing the internal auditory meatus. Below, the firm ligaments

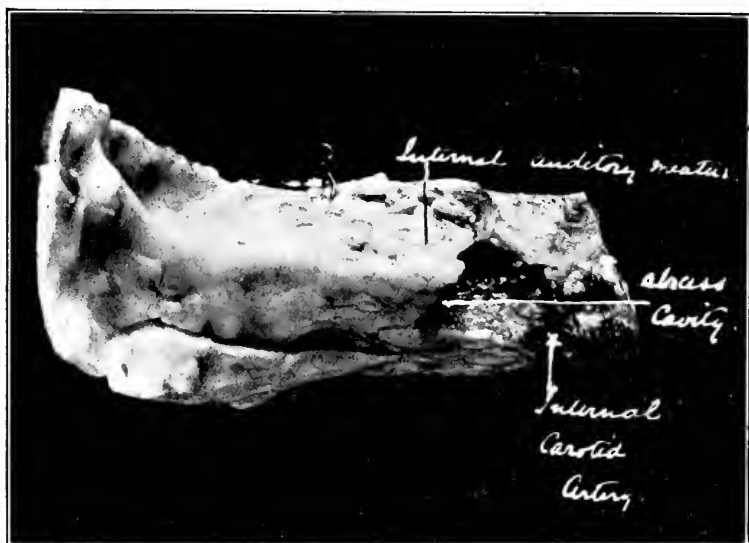


FIG. 1.—Temporal bone as viewed from above.

binding the petrous to the basi-occipital formed the floor. A section was made parallel to the axis of the pyramid traversing the mastoid and tympanic cavity. It showed clearly the track of the infection from the tympanum, by way of the cells extending from the anterior part of the tympanic cavity above and below the Eustachian tube to the carotid canal, and thence to the area of spongy or cellular bone lying at the apex of the pyramid behind the carotid canal, and internal to the internal auditory meatus. The lateral sinus was quite normal, as was the labyrinth.

Further examination of the brain revealed nothing other than diffuse basal meningitis.

Paralysis of the sixth cranial nerve associated with suppurative otitis media is somewhat rare. Most of the cases recover. The

specimen figured above is, I venture to think, of considerable interest to otologists, as it supplements the scanty pathological material which up to the present has been obtained in elucidation

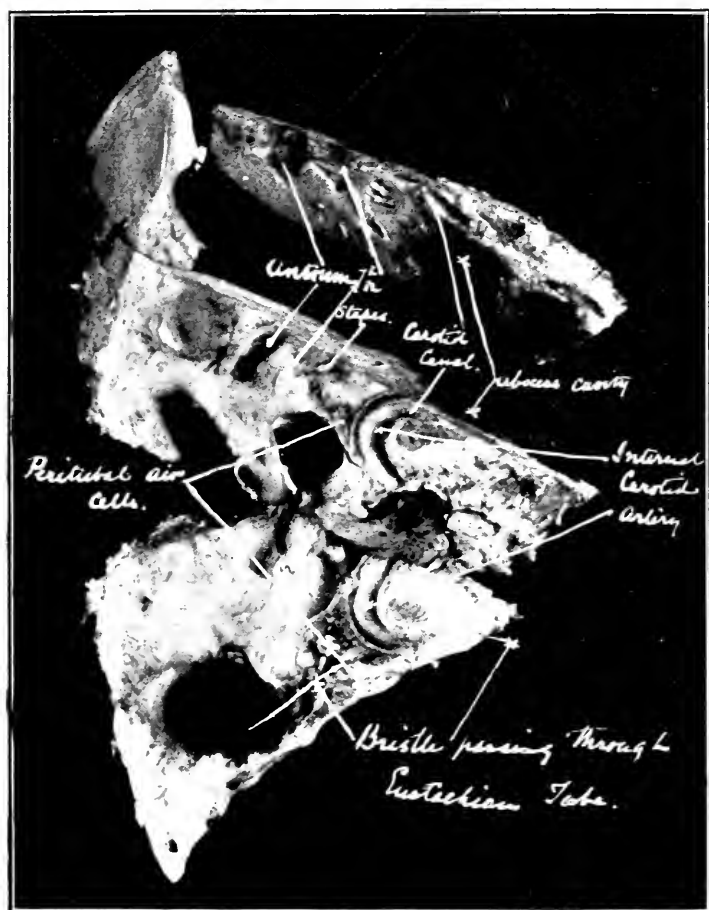


FIG. 2.—A vertical section has been made through the temporal bone, passing through the antrum, tympanum, and carotid canal. The antero-external half of the bone has been turned down. A second section has been made in the horizontal plane, the upper fragment being turned upwards to show the relation of the abscess cavity to the carotid canal.

of the cause of the paralysis, and strengthens the evidence in favour of the views put forward by Gradenigo in his classical article on the subject published in 1907 (1). At the close of this article Gradenigo sums up his conclusions as follows:

“There exists a typical clinical picture, characterised by acute

middle-ear suppuration, with intense pain in the temporal region of the skull, and paralysis of the sixth nerve on the same side. Occasionally the condition arises through an acute exacerbation of a chronic otitis media. In about one half the cases secondary symptoms are present depending on damage of the trigeminus, or oculo-motor nerve, or to meningitis. Mastoiditis, or circumscribed extradural abscess in the sigmoid sinus groove, occur occasionally as complications.

"Recovery is the rule, but fatal cases from diffuse meningitis occasionally occur. The morbid anatomy of the process consists in a diffusion of the infection from the tympanum to the apex of the petrous pyramid by way of the peri-tubal cells and the carotid canal. The sixth nerve is in relation to the apex of the pyramid close to its entry into the dura mater. We have essentially an osteitis confined to the apex of the pyramid with secondary pachymeningitis in the neighbourhood. The extra-dural situation of the lesion explains the usually favourable termination of the inflammation. In a few cases a circumscribed serous or even a diffuse suppurative meningitis occurs.

"Not all cases of sixth nerve paralysis belong to this clinical group. Some cases have a different mode of origin. Among these the most frequent are extra-dural abscess on the roof of the petrous reaching to the apex, and diffuse osteo-myelitis of the cells surrounding the temporal bone (*sic* ? labyrinth) which spreads to the apex of the pyramid. Cases of these classes differ from the typical ones, and the prognosis and treatment are different."

In support of these conclusions Gradenigo has tabulated fifty-seven published cases, and has added eight others which he recounts in detail. Of these he groups twenty-four as "typical cases," *i. e.* with no other symptom than paralysis of the sixth and otitis media, and twenty-nine accompanied by paralysis of other cranial nerves, optic neuritis, sinus suppuration, labyrinthitis, or other complications.

There were eight fatal cases, and the *post-mortem* findings are reported in five. The amount of *post-mortem* material is thus only small, and its value is lessened by the fact that only one of the fatal cases belonged to the "typical" group, the other four being complicated in various ways. The "typical" case is that of Lombard (*loc. cit.*, p. 178), and is closely analogous to the case reported above.

(1) A man, aged twenty, suffered from an acute otitis media with suppuration, some headache, followed by sixth nerve paralysis,

and later by acute basal meningitis. A large abscess in the apex of the petrous bone was found, *post-mortem*. In this case the path of infection was by a channel which would admit the passage of a large bristle, from the aditus to the apical cells. The petrous on the opposite side was also remarkably "pneumatic" in structure, as mercury injected into the apex of the pyramid found its way readily into the tympanum.

(2) In another case of Lombard's (*loc. cit.*, p. 182) there was also thrombosis of the sigmoid sinus. Both petrous bones were of the "pneumatic" type. The path of infection from the tympanum to the apex of the pyramid in which there was an abscess, was not clearly made out. It is surmised that the pus had travelled through the "pneumatic casing of the labyrinth" and the peri-tubal air-cells probably by way of the carotid canal.

(3) Von Noltenius's case (*loc. cit.*, p. 177) is one of acute basal meningitis following curetting of granulations in the neighbourhood of the tympanic orifice of the Eustachian tube. Sixth nerve paralysis appeared four days before death. The bone at the apex of the petrous pyramid seemed softened, and the dura was firmly adherent over it. The sixth nerve paralysis might have been due to meningitis.

(4) One of Gradenigo's cases (*loc. cit.*, p. 179) was similar, *i. e.* acute meningitis induced by curetting granulations in the tympanum. Sixth nerve paralysis supervened along with the meningitis. There was a carious focus in the apex of the pyramid. The petrous on the opposite side was "pneumatic."

(5) Gradenigo's second case (*loc. cit.*, p. 183) is even less convincing. Here an acute otitis was followed by acute labyrinthitis, and sixth and seventh nerve paralysis. After antrotomy the sixth nerve paralysis disappeared, but that of the seventh persisted. Death from basal meningitis. There was an abscess cavity in the posterior wall of the apex of the pyramid, containing a sequestrum. The cochlea was necrosed.

These five cases, so far as I have been able to find, constitute the whole of the pathological material bearing on the aetiology of the sixth nerve paralysis secondary to otitis media. Several cases of associated sixth nerve paralysis and otitis media have been published since Gradenigo's paper (2), but no further *post-mortem* results.

Analysing these cases we notice that in three (1, 2, and 5) an abscess or sequestrum was found in the apex of the petrous pyramid, but in one of these cases (5) the paralysis of the sixth was

only transitory. In two cases (3 and 4) there was evidence of softening of the bone in this situation, with some pachy-meningitis. In both these cases, however, the paralysis of the sixth either accompanied or followed the onset of meningitis, and it might be objected to them that the paralysis might have been caused by the meningitis, and not by the focus in the petrous bone. Cases 1 and 2 are the only ones in which the dependence of the paralysis on a focal inflammation in the petrous pyramid is demonstrated with certainty. One may, therefore, say of Gradenigo's explanation that, though highly probable and rational, the pathological evidence in support of it is rather scanty. The case here reported ranks with the two of Lombard's (1 and 2) in the completeness in that it bears out Gradenigo's description of the clinical features and pathological conditions present in these cases.

In this connection one ought to mention Mr. T. Stoddart Barr's specimen of temporal bone, shown by him at the Annual Meeting of the British Medical Association, 1908 (3). In this case there was no sixth nerve paralysis, but there was an abscess in the petrous bone "below and internal to the carotid canal," and the carotid artery was surrounded by pus. Infection had passed from the middle ear by way of the peritubal cells. The abscess was situated rather lower in the substance of the petrous pyramid than in the other specimens described, and so further from the sixth nerve in the space of Dorello, which fact probably accounted for the absence of paralysis of the nerve. Mr. Barr also described two cases (4) exhibiting Gradenigo's "symptom complex," both of which recovered.

References to this subject in the English literature are scanty. Besides Mr. Barr's cases there is one reported by Mayo Collier in 1901. (5) In the discussion on this case other similar cases were mentioned by Lodge, Dundas Grant, and Woods. Of these only the last-mentioned appears to have been of the class described by Gradenigo. A case has also been reported recently by Muecke (6) to the Otological Section of the Royal Society of Medicine. The discussion on this case would suggest that Gradenigo's views have not received general recognition in this country.

With regard to the clinical aspect of the case reported above, one need only say that it agrees in every particular with what Gradenigo describes as the "typical" class of case, the clinical features of which may be summarised as follows: Simple sixth nerve paralysis unaccompanied by paralysis of other nerves, or by optic neuritis, etc.; severe pain of somewhat indefinite localisa-

tion; middle-ear symptoms slight; hearing only slightly impaired (Gradenigo points out that in many of these cases no spontaneous perforation occurs, but when it does take place it is frequently in the anterior part of the membrane); mastoid symptoms absent or slight; persistence of the paralysis after the middle-ear symptoms have cleared up; markedly "pneumatic" type of temporal bone.

It will be noticed that these cases bear a close analogy to the more common "latent" or "remote mastoiditis," in which an inflammation in the middle ear clears up with or without perforation of the membrana tympani, but spreads to the peripheral cells of the mastoid, in which an abscess is often developed at a later period. The essential point of divergence in the two classes of case is that, in the one, the inflammation spreads from the anterior part of the tympanum forward into the peritubal cells and so to the petrous bone, whilst in the other the infection travels backwards from the attic to the antrum and thence to the mastoid. Probably the slow and insidious spread of the inflammation in both classes of case is due not only to the anatomical character of the temporal bone ("pneumatic" type), but also to the nature of the infecting organism.

The anatomical relations of the sixth nerve at the base of the skull has been thoroughly worked out by Dorello.(7) The nerve enters a canal in the dura mater below the posterior clinoid process, and is here covered by a firm fibrous band—the "petro-sphenoidal ligament." Thence it passes in a forward and outward direction beneath the superior petrosal sinus to the outer side of the internal carotid artery before entering the cavernous sinus. In this part of its course it lies in an "osteo-fibrous canal" (the "space of Dorello"), and is in close relation to, and sometimes in actual contact, at its outer side with the bone at the apex of the petrous pyramid.

The fact that the sixth nerve runs for a considerable part of its intracranial course in this space with rigid walls, within which it may readily suffer compression, probably accounts for the frequency of isolated paralysis of this nerve, even apart from inflammation in the petrous bone, just as the seventh nerve is frequently compressed within the Fallopian canal, causing facial paralysis. Oppenheim (8) gives the following causes of isolated abductor paralysis: Neuritis due to exposure to cold, rheumatism, and syphilis, and post-diphtheritic paralysis. Sphenoidal sinus suppuration (Richter), thrombosis of the cavernous sinus, operations on the Gasserian ganglion, fractures of the base of the skull, and

syphilitic pachy- or lepto-meningitis at the base. In all these various paralyses, with the possible exception of post-diphtheritic, compression of the nerve in the space of Dorello, due either to inflammatory infiltration of the nerve itself, or of the walls of the space, might be the immediate cause of the paralysis.

With regard to treatment, it would be possible, if one could with certainty diagnose an abscess of the petrous pyramid, such as was found at the autopsy in this case, to open the abscess and drain it, after trephining the squama above the tympanum and stripping the dura from the roof of the petrous bone. The route would be the same as for the intra-cranial operation on the Gasserian ganglion. The principal risks would lie in tearing the middle meningeal at the foramen spinosum or tearing the softened or firmly adherent dura mater and causing infection of the subarachnoid space. The difficulty lies in diagnosing the presence of an abscess, as distinct from the commoner condition, non-suppurative inflammation of the apical cells. As a rule, these cases recover spontaneously. In the case here reported, the symptoms never seemed sufficiently severe to preclude the probability of spontaneous recovery until the onset of the acute basal meningitis, so that the advisability of doing an intra-cranial operation was never considered.

REFERENCES.

- (1) GRADENIGO.—*Arch. f. Ohrenheilk.*, vol. lxxiv, p. 150.
- (2) BLANC.—*Annal. des Maladies de l'Oreille*, February 1909, *c.p. Monat. f. Ohrenheilk.*, vol. xxxiv, p. 320.
 MAUTHNER.—*Monat. f. Ohrenheilk.*, vol. xxxiv, p. 794.
 VON STIRLING.—*Ibid.*, p. 1045.
 LOMBARD.—*Ibid.*, p. 1037.
 JACQUES and LUCIUS.—*Ibid.*, p. 1300.
 GAVELLO.—*Ibid.*, vol. xxxv, p. 814.
- (3) STODDART BARR.—*JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, vol. xxiii, p. 556; *vide also* vol. xxi, p. 151.
- (4) *Ibid.*, vol. xxiii, p. 553.
- (5) MAYO COLLIER and WOODS.—*Ibid.*, vol. xvi, p. 536.
- (6) MUECKE.—*Ibid.*, vol. xxix, p. 77.
- (7) DORELLO.—*c.p. Gradenigo's article, l.c.* p. 170.
- (8) OPPENHEIM.—“Diseases of the Nervous System.”

BI-SUBMUCOUS RESECTION OF SEPTUM NASI.

BY J. VAN DER HOEVEN LEONHARD, M.D.,
Amsterdam.

IN cases of simple deviatio or luxatio septi to such a degree as to render difficult normal air passage through the nose, its permeability is generally restored by the execution of the submucous resection after Killian, Freer and others.

A great many modifications of the original method have been described by various authors, but they all start from the same principle: to strip the lining membrane of *both* sides of septum, as far as its deformation extends, departing from an incision at one side.

Crests, spurs and excessive deformations, however, can make it in certain cases very difficult, even practically almost impossible, to strip the lining membrane of *both* sides out of this incision on *one* side, without injuring the former and making a perforation. The difficulty of elevating the lining membrane from its subjacent layer is still aggravated in these cases by the fact that it adheres much stronger at the cartilage and bone at uneven parts, such as crests, spurs and folds, than at even parts of septum. In presence of those facts perforations can scarcely be avoided. They should be avoided, however. Not that they do practical harm, as is generally believed. For as soon as the mucous membranes of both sides are completely grown together on the edge of the perforation, the formation of crusts is stopped by this fact. The growing together now is usually soon accomplished by adequate after-treatment, that is to say by doing nothing that might oppose the regenerating power of the membrana pituitaria. A perforation must be considered as a technical fault, and therefore it must be avoided.

As my modification of the typical operation, intended only for appropriate cases, proved to avoid perforations in cases where the latter could scarcely be prevented in proceeding according to the usual methods, I think I may be allowed to communicate its description.

Fig. 1 represents a variety of septal deformation not seldom met with and chosen for a description of my modification because it gives, on account of the thickness of septum in its anterior part and the peculiar shape of its deformation, as shown by the figure, a very great chance of making perforation in the *left* lining

membrane when operating from the *right* side, whereas it is practically almost impossible to avoid the same at the *right* side, when operating from the *left*.

I then proceed, after surface-application of cocaine (20 per cent.) and suprarenine (1:1000)¹ as follows and as is shown by the figure.

(1) Vertical, slightly curved "button-hole" incision of mucons membrane and perichondrium, just as in the typical submucous

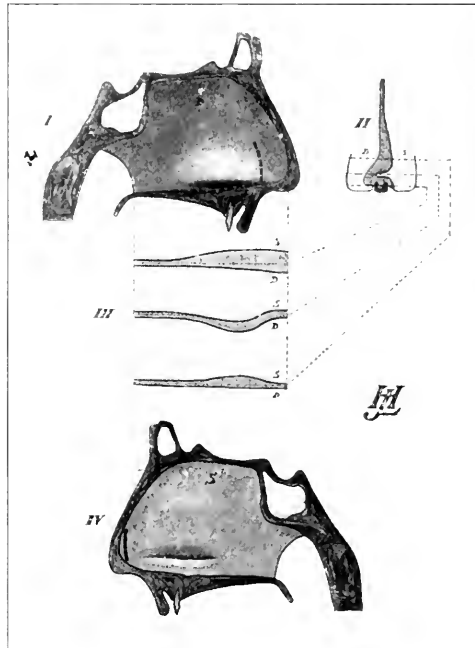


FIG. 1.—I. Right side of septum nasi: the dotted line shows the vertical and the horizontal line of incision, mentioned sub. 3 (see text). II. Frontal section of septum nasi: D = right, S = left side. III. Three horizontal sections of septum, on levels as is shown by the dotted lines, running to II: D = right, S = left side. IV. Left side of septum nasi; the dotted line shows the vertical line of incision, mentioned sub. 1 (see text).

resection, but as far in front as possible: on the border of epidermis. The incision is made to the *left*, because in *this* case the stripping of the lining membrane is easiest on the left.

(2) Stripping of the left lining membrane, over something more than the whole part of septum to be removed.

(3) Incision of mucous membrane and perichondrium on the other (here *right*) side: a vertical one, identical, but not less.

¹ For complete anaesthesia submucous injection is by no means necessary.

than $\frac{3}{8}$ in. behind the first, on the other (here *left*) side, followed by a horizontal incision, something further than the septum—deformation extends, and just on the level of the floor of nasal cavity (see the dotted line, fig. \times I).

(4) Stripping of the right lining membrane as far as necessary, which forms a flap, that usually curls and retracts itself upwards.

The whole deformed part of septum is now at both sides, behind the vertical incision on the *right*, denuded.

(5) Incision of the cartilage just in the vertical incision (sub 3) on the *right*.

(6) Removing of the whole deformed part of cartilage with Ballenger's swivel-knife.

(7) Removing with gouge, hammer and forceps of the vomerine part of the deformation down to the level of the floor of nasal cavity, especially in front, and backwards as far as spina septi, included. The whole deformed part of septum is now removed, except the small portion situated between the two vertical incisions sub 1 and 3.

(8) Incision of the cartilage in the first button-hole incision on the *left*, with great care not to enter the opposite nasal cavity.

(9) Careful stripping from this (left) side of the small portion of mucosa still adhering to the corresponding cartilage at the right side, in front of the incision sub 3.

(10) Removing of the small piece of cartilage between the two vertical incisions, now denuded. If necessary this act must be completed down to the floor of nasal cavity with aid of gouge, hammer and forceps.

(11) Cleaning of both sides of nose with H_2O_2 solution, followed by blowing vioform.

(12) Introducing of a small gauze tampon at each side. Antiseptic gauze (iodoform, vioform) is to be preferred above aseptic, because a wound in the nasal cavity must be considered as a relatively septic one. The tampon may be greased with a slightly antiseptic ointment, by which its removing is facilitated.

The reflected flap of mucous membrane, stripped off at the (in this case) right side, should now be pulled down and sutured. This act, however, miscarries often by reason of its curling and retracting upwards. On anatomical preparations this suturing is very easy on account of the absence of turgidity in dead tissues. Two methods can be adopted: (1) cutting off the curled and thickened part of the flap, avoiding by the same its producing local undesirable thickenings that might hinder normal healing;

and (2) pulling the flap down as much as possible and maintaining it in this position whilst the tampon is introduced. It depends upon local eventualities and personal views which of those two methods will be adopted.

The tampon at (in this case) the left side can be easily removed next day. That on the right will prove to adhere very tightly; it must be soaked with appropriate solutions, such as H_2O_2 solution or solutio acetatis aluminici at 5 per cent. After some days it will be possible to remove it by gentle pulling. When it is detached too soon or with too much force there is a serious danger to tear open the whole membranous part of septum.

After-treatment consists in rinsing the nose during some weeks with an isotonic, slightly antiseptic solution. In some cases a few applications of 5 per cent. $AgNO_3$ are desirable. As the mucous membrane of the nose has a powerful tendency to regeneration, the parts of septum that have lost their lining membranes are covered with epithelium, by proper after-treatment, within some weeks. It is the task of after-treatment to avoid the formation of hard crusts in the first time after the operation by gently rinsing the nose. Any force in blowing out those crusts or in sneezing impede, as well as superfluous manipulations in the nasal cavity with instruments and medicaments, the regeneration of epithelium. No application of $AgNO_3$ solution should be done without indication.

As soon as the pituitary membrane is completely restored, crusts will no more be formed.

Perforation in the front part of septum will not occur, because the two vertical incisions sub 1 and 3 never can cover themselves. Perforation in the other parts of septum need not occur, because there is always *one* side of the latter where the lining membrane can be stripped, departing from the *same* side, without fear of injury.

I would call the above modification *bi-submucous resection* in abbreviation of "bilateral submucous" resection, because it may be considered as a combination of two typical submucous resections, each of them departing from a different side of septum.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

February 6, 1914.

DR. D. R. PATERSON, *President, in the Chair.*

Intranasal Operations on the Lachrymal Sac.—D. R. Paterson.

[See JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, April, 1914, p. 169, *et seq.*]

Double Intranasal Dacryocystotomy for Lachrymal Disease.—

D. R. Paterson.—Girl, aged sixteen. "Watering" of both eyes noticed for three years. She had been treated two years ago for atrophic rhinitis, which was still present. About five weeks before admission a phlegmon appeared over the left lachrymal sac with the formation of an abscess or fistula. On the right side there was a blenorrhœa of the sac, a quantity of thin pus being evacuated on pressure. West's operation of opening the sac from the interior of the nose was done on both sides. On the right, part of the sac wall was overlapped by an affected ethmoidal cell, which was opened up; on the left it was necessary to resect the upper part of the septum in order to get room. The result of the operation was immediate and the fistula closed. The case illustrates (*a*) some conditions of the tear-sac brought about by stenosis—viz., blenorrhœa of the sac, dacryocystitis, phlegmon, and fistula, and their dependence often upon a nasal affection—*e. g.*, of an anterior ethmoidal cell, which may be laid bare only by operation; (*b*) the intranasal conditions usually met with in the operation; (*c*) the advantages of the intranasal route to the lachrymal sac.

Mr. HARMER had recently seen a gentleman, aged twenty-seven, who had had epiphora since he was aged fifteen, following upon an injury. He had consulted ophthalmic surgeons in different parts of the world, and had spent £2400 on operations of various kinds, but none of them had done good. In this country he did not think there had been enough experience to know what the results of the intranasal operations were. They were easy to perform. The first results were quite satisfactory.

Mr. HERBERT TILLEY asked what was the swelling in the right nostril; it appeared to be the anterior end of the middle turbinal. He had done the operation only once, and that was last week, so he could not say anything definite about results. It appeared to be easy when the ethmoidal cell had been got out of the way, with the finger externally on the lachrymal sac to prevent damage being done. In the case of a very narrow nose the operation might be a difficult procedure.

Dr. DONELAN thought the difference of opinion as to the merits of the external and internal methods would be settled by a more careful selection of cases for each mode of operating. It seemed to him that those in which the obstruction was high up in the lachrymal canal, or which were of purely ocular origin, would be better treated by the external operation which had, moreover, the advantage of not opening healthy ethmoidal cells. On the other hand, in cases due to intranasal disease the internal

method would be found preferable. Dr. Donelan thought it was Strazza who first performed and described the operation, now known as West's, in the same year, 1904, as Toti published his external method.

Mr. HOWARTH agreed with Mr. Harmer that this was an operation that they would all have to perform: he thought that the cases which would probably come under their notice would not be simple stenosis cases, but those of purulent dacryocystitis, where the suppuration was being kept up by a diseased ethmoidal cell. His experience was limited to two cases in which excision of the lachrymal sac had failed to cure the condition. He did West's operation, but did not find it easy, as the ascending process of the superior maxilla appeared to overhang the duct and made the approach difficult. This operation was satisfactory in that it enabled the surgeon to deal effectively with those anterior ethmoidal cells which lie in front of the hiatus semilunaris and abut on the lachrymal duct. It was as yet early to say what the results were likely to be.

Dr. JOHNSON HORNE hoped that an operation which promised to be beneficial in suitable cases would not be brought into discredit by eagerness out-running discretion; and that they would hear more of the contra-indications and of the difficulties in performing the operation.

Dr. DAN MCKENZIE showed a case in which the operation was done eighteen months ago. He had not seen it for eight months and one could not now see any signs of the operation wound in the nose. The patient was quite cured.

Mr. E. D. DAVIS said on the cadaver the operation did not seem to him difficult. One patient, however, had a very deep middle meatus, and an overhanging nasal process, and that was a very difficult operation.

The PRESIDENT, replying to Dr. Hill, said the question of slitting the canaliculus to introduce a probe was a point of controversy between Polyak and West. West usually slit the punctum and introduced a stile, and that made it easier. Polyak held that the suction action of the punctum was thereby interfered with, and it was not desirable to do that more than could be helped. In his own cases he (the President) had not touched the punctum, except to syringe through afterwards. One could easily feel the probe in the sac from the outside; one could also easily measure by one's eye, and determine the position of the sac. He agreed that the first to do the operation was Strazza, of Genoa, who did it in 1904, though he had not done any since. West had done 130 cases, with a very large percentage (90) of what may be regarded as cures. The latest figures from Polyak were forty-two operations. He thought that ophthalmologists would hand over these cases in future, when sufficient experience of the lasting results of the operation had been gained, for it was not difficult to carry out, and its success was striking.

Resection of the Pharynx for Carcinoma.—E. B. Waggett.—Woman, aged forty-seven. Operation in February, 1913. The flap was cut with the intention of removing the larynx with the pharynx; consequently, no skin was available for a plastic operation. The whole of the hypopharynx was removed with the exception of a strip of the right lateral wall $\frac{1}{2}$ in. broad. Case shown to illustrate: (a) spontaneous adaptability of the parts; (b) absence of cicatricial stricture; (c) functional recovery of the left arytaenoides posticus muscle.

Resection of Larynx and Pharynx.—E. B. Waggett.—Debilitated man, aged sixty-five. Extensive carcinoma of pharynx, laryngeal vesti-

bule, and tongue, commencing in left pyriform fossa. Palliative measures dictated by dyspnœa and very severe dysphagia. At the patient's request a radical operation was performed in November. A strip of the right pharyngeal wall, $\frac{1}{2}$ in. broad, was retained. The case illustrates the spontaneous adaptability of the parts still in process of healing. Facial palsy was produced by a very extensive gland operation with resection of the sternomastoid.

Sir FELIX SEMON congratulated Mr. Waggett on the success in his first case, not only because it was a brilliant case, but because it represented the victory of a principle—namely, of the triumph of the early diagnosis in these extrinsic cases, which so far had been so sadly wanting. He had never been much enamoured of the operation for total extirpation of the larynx, though he admitted that it could not be helped in some cases. But henceforth, just as in intrinsic cases, the ground had been cleared for thyrotomy by early diagnosis, thus it should be the endeavour of every laryngologist to diagnose also extrinsic cases so early that, as shown by Mr. Waggett's case, it was no longer necessary to remove the whole larynx.

The PRESIDENT thought that laryngologists in this country were, perhaps, not hopeful enough of such cases. Three or four months ago he saw some excellent results in Prof. Glück's clinic.

Mr. WAGGETT replied that these two cases were at the extreme poles of the class of case to which they belonged. In one case there was early diagnosis, thanks to the direct method; the other he had watched dying for six or eight months, and finally, *ad misericordiam*, he had removed the larynx at his request. He was not proud of the technique in the first case. The operation was started as an extirpation of the larynx, but, finding the larynx could be retained, he did the best he could under the circumstances, there being no skin-flaps available. He brought the case forward in order to show that Nature sometimes did all that was required. The woman seemed bound to have an almost complete stricture of the pharynx, but the event proved otherwise, and she now swallowed ordinary solid food, and did so better day by day; and twelve months had elapsed since the operation. Whether this happy circumstance was due to the nasal tube having been kept from the nose to the stomach for six weeks he could not say, but the presence of a foreign body prevented close cicatrisation of the parts, and enabled the strip of mucous membrane, $\frac{1}{2}$ in. broad, left in the right fornix, to cover the raw surface. Now a bougie the size of the little finger could be passed through the stricture.

Advanced Gummatous Laryngitis.—G. H. L. Whale.—Woman, twenty-three. When first seen by the exhibitor, one month ago, the the infiltration of epiglottis, ventricular bands, and arytenoids quite obscured the rima. Through a Killian's spatula he removed a piece of each arytenoid. The pathological report stated: Granuloma with no giant-cell systems; Wassermann's test positive. On January 13, he gave her 0.9 gr. of "914" intravenously. Marked local, but no general, reaction. One week later the lesion was clearing, both cords were visible. Specimens were shown.

Sphenoidal Sinus, after Operation, showing Good Drainage.—G. H. L. Whale.—Female, aged fifty-one. Operated on five months ago. Concentric closure of the sinus mouth by mucosa, which so often gave a disappointing result in these cases, had not occurred. The other

sphenoidal sinus was not at present accessible, owing to a deflection of the septum; and headache had disappeared from the operated side of the head, but not from the other side.

(?) **Lupus of the Nose.**—**G. H. L. Whale.**—Male, aged twelve. There was much heaping-up of granulomatous mass on columella. The disease extended on to the outer wall of left vestibule. Duration of disease, one year with intermissions. The case was shown for diagnosis, because the angry red appearance of the mass, and the absence of apple-jelly areas, had led several surgeons to diagnose streptococcal infection.

Dr. DONELAN asked what portion of the arytenoid was removed.

Dr. JOHNSON HORNE deprecated the removal of a piece of each arytenoid from the larynx. If it was done for diagnostic purposes, then, Dr. Horne considered the Wasserman test would have been in every way sufficient. He had frequently seen similar cases rapidly clear up under iodide of potassium and mercury without any surgical intervention.

Mr. WHALE replied that with regard to iodide being sufficient, some liked to use modern methods, so he gave the patient salvarsan, and the case was doing very well. The case was sent to him by a dermatologist as being tubercle. The laryngeal appearances suggested a post-ericoid growth, with œdema all over it, and he punched a piece out to exclude neoplasm.

Inflammatory Fixation of the Left Arytenoid following supposed Impaction of a Foreign Body in the Larynx.—**George Wilkinson.**—The man, aged sixty-eight, was seen first on the evening of October 21, 1913. About seven hours earlier in the day, whilst eating some "hash," he choked and felt a piece of meat stick in the throat. He made violent expulsive efforts and attempted to dislodge the obstruction by repeatedly passing his finger down his throat. He "could get hold of something, though he could not get it up." On examination great difficulty was experienced in obtaining a view of the larynx, owing to the patient "gagging." After cocaineisation a view was obtained by direct laryngoscopy. The epiglottis, arytenoids, and aryepiglottic folds were inflamed and much swollen, the swelling being more considerable on the left than on the right side. On the posterior surface of the epiglottis was a plaque of fibrin, which was readily removed by the forceps. The underlying surface was excoriated. Severe pricking pain on swallowing persisted for some days. The voice remains weak and husky. Swelling still remains, chiefly of the left ventricular band. The left arytenoid is displaced outwards and somewhat forwards, and does not move perceptibly on phonation, though there is some adduction of the left vocal cord. Nothing abnormal was seen on the X-ray screen. An examination was made by direct laryngoscopy on December 16 under general anaesthesia. No foreign body was detected.

Foreign Body (a piece of bookbinding wire) removed under Direct Laryngoscopy, after having been impacted in the Larynx Four Months.—**George Wilkinson.**—The patient, a boy aged three, was first seen on October 30, 1913. The child had been admitted to a fever hospital on July 6, notified as diphtheria, with laryngeal obstruction which had begun four days previously. Antitoxin had been given. A tracheotomy was done. Subsequent examination of swabbings from the throat showed absence of Klebs-Loeffler bacillus. The tube was removed, and had to be replaced several times. Early in October an abscess appeared to have formed within the larynx, and to have burst with free

discharge of pus through the tracheotomy wound. At this time there was great dyspnoea, in spite of the presence of the tube. The tracheotomy wound had now healed, but there was decided laryngeal stridor, croupy cough, and husky voice. Examination by direct laryngoscopy immediately revealed a bright band below the left vocal chord, lying antero-posteriorly, visible during inspiration. It looked like a pin. It was grasped by the forceps, and readily removed after the point had been disengaged from the mucous membrane below the anterior commissure in which it was embedded. It was found to be a piece of bookbinding wire, bent into the form of a letter Z. All symptoms disappeared next day.

The PRESIDENT said some years ago he recorded an instance of an infant, aged nine months, which had a collar-stud impacted in the larynx, where it remained three months. The child had a choking fit at the time, and then the parents forgot about it. Three months later the infant began to crow, and when seen at the hospital it had definite stridor. Examination by the direct method revealed the body impacted in the larynx.

Dr. H. J. DAVIS said he thought the first case looked rather like malignant disease of the larynx. There was more infiltration and fixation than trauma from a foreign body usually produced. With regard to "getting hold of something which could not be brought up," it was easy for a person to catch hold of his own hyoid bone and try to pull it out, and this was sometimes done. He knew of the case of a nun who, some twenty years ago, was brought up to a casualty department with the history of a rabbit bone impacted in the throat. An enthusiastic dresser said he could feel the bone with his finger, and, seizing a large pair of old Mackenzie forceps, pulled out the end of the great cornu of the hyoid bone with the muscles attached.

Mr. HERBERT TILLEY thought the possibility of malignant disease should be borne in mind. The possibility of a foreign body had also occurred to him, but he felt sure that Mr. Wilkinson would have satisfactorily excluded this factor.

Sir FELIX SEMON said the disturbance produced by a foreign body could result in lasting ankylosis of the arytaenoid cartilage. He remembered two cases, both of which he had described. In the first, a boy got a pin which was driven, through a swallowing movement, through the aryepiglottic fold, close to the arytaenoid cartilage, so that the point of the pin was in the oesophagus. A casualty surgeon sent the case up to a surgeon, and the latter proceeded to put his finger into the patient's throat to ascertain its situation. But when he wanted to withdraw his finger it got caught by the point of the pin, and the more he tried to withdraw it more he was pricked. Ultimately the patient was sent to the Throat Department, where the pin was easily visible, and was removed. There remained, however, lasting ankylosis of the arytaenoid articulation. The second case was one of impaction of a walnut-shell in the larynx, which set up so much swelling and irritation that, if there had not been a definite history of a foreign body, the laryngoscopic appearance would certainly have been regarded as characteristic of malignant disease. It was removed by external operation, but in that case also there remained lasting ankylosis of the crico-arytaenoid articulation.

Mr. WILKINSON, in reply, said, with reference to his first case, that it was a fear that the infiltration of the larynx might be malignant, which induced him to subject the man to a general anæsthetic and direct inspection of the larynx. This was over a month ago, and at that time the left arytaenoid overhung the glottis so much that he could not get any

view of the interior of the larynx by indirect inspection. Since then the swelling had gone down very much, and the mobility of the arytenoid cartilage had definitely increased. That seemed to be against malignancy. By direct inspection he could find no sign of malignant growth on the surface of the larynx. There was no evidence of any foreign body having ever got into the larynx, though it is clear that he had some choking during eating. His own idea was that the damage might have been caused by the man's finger-nail. He saw the case seven hours after the choking attack, and the man was still in great distress, and was working away at his throat with his finger. The larynx was very red and swollen, and that swelling remained without much change for over two months. Was it possible for a man to scratch the inside of his own larynx with his finger-nail? The marks at the back of the epiglottis seen at the first examination looked very much like scratches.

Orbital Cellulitis due to Ethmoidal and Frontal Sinus Disease.

—**H. A. Kisch.**—C. B.—, aged fourteen, when first seen was suffering from orbital cellulitis. An abscess had formed two months previously above the left eyelid, and had burst, leaving a fistula, the orifice of which was situated just above the upper eyelid and about half-way out. A probe inserted through this fistula passed into a cavity which was found to contain pus. On examining the nose, pus was seen under the middle turbinal, and there was extensive ethmoidal disease. On December 16, 1913, an operation was performed. The fistula was found to lead into an ethmoidal cell, and the frontal sinus was full of pus. The complete Killian operation was performed, and the patient rapidly recovered.

Cicatricial Pharyngeal Diaphragm following Scarlet Fever.—

J. F. O'Malley.—A boy, aged five, had scarlatina two years ago, and was then for about three months in a fever hospital. On returning from hospital it was noticed that he "spoke through his nose," and the condition has become worse since then. He can swallow solids and liquids without difficulty, and there is no history of interference with breathing.

On examination of the throat one sees a diaphragm, appearing as a continuation downwards of the soft palate and formed by the union of the free edges of the two posterior pillars. It shuts off the naso- from the oro- and hypopharynx and is complete except at the centre of its upper and lower borders. The upper opening is a small space surrounding the normal uvula, in which the latter is free to move. At the lower border there are two openings, one on each side of a central adhesion, which passes obliquely downwards and backwards to the right and is attached to the posterior wall of the pharynx, opposite the level of the epiglottis.

The anterior pillars, at their upper ends, blend with the new diaphragm, whilst the lower ends are normal and behind the latter. On the anterior aspect of the new formation the tonsils can be seen appearing rather superficial owing to the partial obliteration of the sinus tonsillaris.

The PRESIDENT said he supposed Mr. O'Malley would be able to pass a probe behind right away down, as there did not seem to be attachment to the posterior wall of pharynx, except at the lower border.

Dr. DONELAN thought it would be easily dealt with by simple division and suturing over the cut edges.

Mr. HARMER said that the difficulty was that the adhesion was likely

to form again after a cutting operation. He suggested that recurrence would be less likely if division were made by diathermy.

Mr. O'MALLEY replied that if one cut down the middle line there was merely connective tissue substance, having no contractile power, and with inspiration or suction of air it would be quickly drawn against the nasopharynx and adhere again. He believed the method of formation of these adhesions was as follows: There was an intense inflammation with inflammatory infiltration, and at the same time a myositis which put the muscular tissue in a condition of paresis. The swelling and infiltration, especially in the young child, facilitated the coming together of the parts, and the intensity of the myositis prevented the mobility which would otherwise exist and enable the parts to come away from each other. A denudation of epithelium proceeded at the same time, owing to the severity of the inflammation, and that facilitated the joining up.

Demonstration of the Exhibitor's Method of Intranasal Operation for Antral Sinus Suppuration.—P. Watson-Williams. [See JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, March, 1914, p. 113, *et seq.*]

The PRESIDENT asked if the exhibitor made a point of taking away the anterior ridge of the inner wall of the antrum. In the case of any secretion in the antrum, and the patient bending down, might not the secretion tend to fall out? He remembered once it was a serious inconvenience, for a patient had some watery secretion from the antrum for some time, and when she bent down at mealtimes it often fell out.

Dr. WATSON-WILLIAMS replied that one of the advantages of doing the operation in the way he advocated was that the patient was able to blow his nose clear of secretion in the antrum. The current of air entered the antrum, swished round the corner and took everything out. But if a ridge of the anterior part of the inferior meatal wall was left, the pocket retained the secretions and the patient was more likely to have his antrum constantly sodden. In the large preponderance of cases in adults the antrum developed forwards, so that one could bring the opening slightly in front of the end of the inferior turbinal. When the antrum was small that could not be done. The intranasal operation in such cases gave good results and was not more difficult, only it did not bring the aperture forward in the way shown in the specimen.

? New Growth of Ventricle of Larynx.—C. I. Graham.—Female, aged forty-seven. Hoarseness and cough for three or four months. A small portion of the growth has been removed for microscopical examination. There was a smooth sessile swelling in the anterior part of left ventricle, obscuring the anterior third of corresponding vocal cord. The overlying mucous membrane was paler than that of the larynx generally. The colour and movement of the cords are normal. There are no palpable glands in the neck, and Wassermann's reaction is negative.

Dr. JOBSON HORNE referred to a paper which he read at the meeting of the British Medical Association at Brighton last year on "Tumours of the Ventricle of the Larynx." In that paper he had described a hyperplasia of the ventricular band which he had observed years ago in the *post-mortem* room and also clinically, and which simulated a tumour of the band. He regarded the case before them as one of innocent hyperplasia of the kind he had described.

Mr. GRAHAM agreed.

Double Ogston's Operation performed for Chronic Frontal Sinus Disease.—**W. Stuart Low.**—The exhibitor considers that the success in this case and the absence of blemish are to be attributed to the method adopted, viz., by commencing the incision under the eye-brow, gradually sloping upwards, and then stretching the tissues upwards; the periosteum was divided high up and stretched downwards. When the wound is stitched up these displaced tissues return to their original position, so that a valve-like wound results, the one flap overlapping the other obliquely. The wound is protected from bandage pressure by means of a specially shaped cage which, having rubber-covered edges, acts like a Bier's band in facilitating rapid union—it also allows of free exudation of fluid between the edges of the wound. The method had been followed by restitution of bone, and is one of the advantages gained, another being diminution of deformity by preventing collapse of the anterior sinus wall. The patient was operated upon last July, fourteen days intervening between the two operations.

The exhibitor favours the Ogston operation in preference to the Killian, and he exhibited the case, which was a very severe one of its kind, as an example of many more treated similarly with success by the Ogston method.

Double Paralysis of the Superior Laryngeal Nerves in the Course of Disseminated Sclerosis from Lead Poisoning.¹—**James Donelan.**—Male, aged twenty-six. As the history of this case has been fully given already in the *Proceedings* it has been suggested that, in view of the great rarity of reported cases, it may be well to call attention here only to the laryngeal symptoms.

Owing to the advancing nerve degeneration, which now affects about equally both crico-thyroid muscles, on phonation the anterior end of the glottis is now no longer turned obliquely to the right, the side first affected, from overaction of the still comparatively unimpaired muscle of the opposite side. The interior of the larynx is now somewhat more difficult to see owing to increasing paralysis of the tongue and epiglottic muscles. The bending forwards of the arytaenoid cartilages is also more marked. On phonation with gentle expiration the classical wavy outline of the glottis can be well seen, but this is lost if the air-stream is forced and the elliptical glottis is formed. With stronger expiration the cords are blown upwards and flap in the air current. The patient can sustain a low, rough note fairly well, but it is impossible for him to raise the pitch more than one or two tones, and then he cannot sustain the note. Careful palpation shows that the distance between the thyroid and cricoid cartilages is not diminished perceptibly on phonation. Owing to the paralysis of the pharynx, tongue, and epiglottis, the patient is often troubled by the entrance of solid and liquid food into the larynx.

Dr. JOHNSON HORNE said there appeared to be good adduction and abduction of the cords, but the tension of the cords was impaired.

Sir FELIX SEMON said that in this case, if he had not heard Dr. Donelan's description that there was double superior laryngeal paralysis, he would not have seen it. To be frank, he saw nothing but a little relaxation of the vocal cords. Cases of genuine paralysis of the crico-thyroid muscles were extremely rare, but the wavy outlines of the vocal cords seen in them looked very different from what was at present visible

¹ Shown at the meeting of June 6, 1913; see JOURNAL OF LARYNGOL., RHINOL., AND OTOL., Jan., 1914, p. 33.

in the case shown. In this case he could say nothing more than that there was some relaxation of the vocal cords.

Dr. DONELAN regretted that Sir Felix Semon was not present on one of the earlier occasions on which he had shown this case, or that he had not seen it earlier in the sitting, when the patient was less fatigued, and when the wavy line was more easily elicited. It seemed to depend a good deal on the power of controlling the expired air, so that the cords did not blow apart. He had now had the patient under observation for over eighteen months, and had had the good fortune of following the gradual development of the symptoms. He had seen no report of a case in which this had happened. He had not the slightest doubt as to this being one of double paralysis of the superior laryngeal nerves. If he had it would have been dissipated by the observations of two such excellent witnesses as Sir Felix Semon and Dr. William Hill, for slackness of the vocal cords and their almost complete disappearance under the lateral walls on inspiration were the two cardinal features of this rare disease, which had been described by nearly everyone who had published cases. He could not attribute any other diagnostic significance to these features in the present case, than that they showed the loss of crico-thyroid control over the other muscles. There appeared to be lately some failure of the transversus, which might be due to a partial innervation from the superior laryngeal nerves.

Double Abductor Paralysis in a Child, aged eight.—C. W. M. Hope.—Child, aged eight, was admitted to hospital, 1913, with marked dyspnoea. Up to fourteen days before admission was perfectly well; gradual onset of dyspnoea, but voice was not noticed to be altered.

When first seen the voice was good, but there was marked dyspnoea, sucking in of intercostal spaces and supra-clavicular regions; marked retraction of lower end of sternum, and slight cyanosis. Temperature normal; pulse 120. On examination by the direct method under chloroform both cords were found fully adducted, normal in colour, and no movement seen, either of them or of the arytaenoids, which were of normal size. Only a tiny area for aeration at posterior end of glottis. Intubation tried with O'Dwyer's tubes, but they were coughed out within a few minutes of introduction. Tracheotomy was then performed. After four days tube was blocked by day and opened by night. Swab from larynx showed absence of Klebs-Loeffler bacilli.

Three weeks later cords showed some movement; there was slight abduction and also some movement of the arytaenoids.

Tracheotomy tube had been removed and left out on January 14, 1914, but owing to night stridor was replaced (low tracheotomy) on January 29, 1914. Skiagram of chest shows no enlargement of thymus gland or any increase in size of bronchial glands. No diagnosis has been arrived at as to the cause of the paralysis.

Dr. LAMBERT LACK said at present he had a case of exactly the same nature, in a small child. Tracheotomy was done over two years ago. When the child was seen in the out-patient room the cords appeared to be normal, and the cause of the stridor and dyspnoea was not recognised. On passing a bronchoscope to ascertain the cause of the dyspnoea, directly the instrument entered the larynx the dyspnoea was relieved. On removing the bronchoscope again, it was seen that the cords remained in the middle line. Tracheotomy was performed, and after some months the tube was left out, as the cords seemed to move a little. But during the last week the child had come up again very ill

and suffering from loss of weight; it was not half the size it should be for its age. Obviously it had been suffering from deficient oxygenation for years. Now that the tube had been replaced, the child's development would probably go on. No cause could be discovered for the paralysis, and the condition appeared to be congenital. Some years ago he showed another case in a girl, aged eighteen, in whom no cause could be found for the paralysis, and in her also the history dated back almost to infancy.

Dr. PETERS had seen this condition exist to a modified degree with congenital deformation of the epiglottis, and he believed it was characteristic that the voice was not lost, and the paresis varied greatly.

Dr. H. J. DAVIS thought both recurrent laryngeal nerves were being pressed upon by enlarged mediastinal glands, and he had recently had a case very similar in a child, aged two, who died with left total recurrent paralysis, due to pressure of lymphomatous glands in the thorax. The child was sent to him as a case of foreign body in the lung. The child got worse, developing bronchitis and paresis of the other cord. As soon as the bronchoscope was passed the child breathed easily. He did a tracheotomy, but three weeks later the child suddenly died. *Post-mortem*: Enlarged glands were found in the mediastinum, the left recurrent laryngeal nerve being implicated in the mass. The glands were lymphomatous, and there was no sign of tubercle.

Note of the Result of Treatment of an Unusual Case of Adductor Paresis.¹—E. D. DAVIS.—Acting on the suggestion kindly given by some of those members present who saw the case of a healthy gardener suffering from what was considered to be an intractable case of functional aphonia, the patient was anæsthetised on January 27 and the larynx thoroughly examined by suspension laryngoscopy and the bronchoscope. There was practically no movement of the vocal cords, which remained more or less hidden in complete abduction. The hypopharynx and trachea were normal. Stimulation by the intra-laryngeal electrode, with the full strength of the battery, produced no effect beyond a slight movement of the epiglottis and posterior commissure, probably produced by contraction of the aryteno-epiglottidean folds. It is suggested that the case is one of paralytic contracture or atrophy of the laryngeal muscles. Intra-laryngeal stimulation on recovery from the anæsthetic was unsuccessful.

Sir FELIX SEMON asked what was meant by the words "It is suggested that the case is one of paralytic contracture or atrophy of the laryngeal muscles."

Mr. E. D. DAVIS feared the explanation asked for was very difficult to give. Dr. Gordon Holmes said the case could not be functional if there was paralytic contracture, but Dr. Holmes could not find organic disease. Five years ago, when he saw the patient, it was a case such as is described in the text-books as paralysis of the arytenoideus, with a chink in the posterior third of the glottis, forming a triangular interval. The cords moved well, but, on vocalisation, only the anterior two-thirds of the cords came together. There was a chink at the back. He did not see the patient for five years, but he saw him repeatedly when he had arytenoideus paralysis. The man deserted the hospital, and then came up again five years later.

¹ Shown at the last meeting of the Section held on January 9. See JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, April, 1914, p. 205.

Sir FELIX SEMON wished to make some observations on this case because he would be sorry for any loose expression to go unchallenged. He could not help asking: Why make any suggestion? There was no need for it in the present case. He thought everyone who had had experience would say it was a case of functional double paralysis of the adductors. It happened in a male, which was not an unheard-of thing, and the cords stood very widely apart. Neither was that unheard of. If one read the older literature, that which was produced in the infancy of laryngology, one would find several cases described in which the glottis during quiet respiration was so widely open that it would admit a full-sized finger. Such cases had been described by Czermak and Solis Cohen. In his own paper on "Abductor Tonus," though that was published twenty-four years ago and perhaps had therefore no right to be quoted nowadays, one would find it stated that in quietly breathing people the width of the glottis amounted sometimes to 14 mm. when seen with the graduated mirror, which corresponded to 19 mm. actual width. If in such a case functional bilateral adductor paralysis occurred, as, he had no doubt, had occurred in this case, there was no need to seek refuge in a paralytic contracture, a hypothesis which, he was glad to hear, had already been combated by Dr. Gordon Holmes on general neurological grounds. It was sufficient to describe it as a double adductor paralysis in a man whose glottis, before he had anything the matter with him, was probably widely open in quiet respiration. The mere fact that this case had not yielded to treatment did not stamp it as an extraordinary one. Again he would revert to the older literature, in which one could read cases described by Sir Morell Mackenzie or any of the older writers, in which, while they succeeded almost universally in functional paralysis in restoring function by electricity, or hypnotic suggestion, or by cold water douche, or by central faradisation, or methodical voice practice, or other methods, they freely admitted that there were always a few cases remaining in which practically no method was of avail. The present case seemed to be one of those, and he would not be surprised if, when the paresis had lasted ten years or more, one day, without apparent rhyme or reason, the voice were to return. Perhaps the oldest case on record was that described by Herodotus, in which the patient, the son of Cresus, suddenly regained his voice when someone was about to slay his father, for he suddenly shouted, "Do not kill the king." That might have been a case of hysterical mutism, but anyhow it was under the influence of a strong emotion that the voice came back, and very likely the voice would come back to the present patient under some such stimulus.

Dr. LAMBERT LACK said he was much interested in what Sir Felix Semon had just said. The majority of functional aphonias recovered, but a few did not. Why was it that the cases which did not recover were those which showed paralysis of the arytaenoids? In his experience, it was those cases where there was a triangular opening between the posterior parts of the vocal cords which did not yield to treatment; in fact, that class of case produced all the failures. He thought that some of these cases were organic. There was one case in the hospital in Golden Square who attended during Sir Morell Mackenzie's time. She was attending for forty years, and at the end of that time the larynx gave exactly the same picture as when at first seen. He had since seen two or three others in his practice, and all had paralysis of the arytaenoids, that being apparently the only adductor affected. The case which Sir Felix Semon mentioned was one of functional mutism.

Sir FELIX SEMON rejoined that the case referred to by Dr. Lack was absolutely different from Mr. Davis's case. He remembered the case Dr. Lack spoke of. In Mr. Davis's case the glottis was open to the greatest possible width, and the vocal cords could scarcely be seen because they were lying close to the sides of the larynx, whilst the case mentioned by Dr. Lack was one of isolated paralysis of the interarytenoid muscle, possibly of peripheral neuritic or myopathic origin.

Paralysis of Right Vocal Cord.—W. H. Kelson.—F. R.—, aged forty-eight, bus driver. Hoarse six months. No history of syphilis. Nothing abnormal detected in chest. Larynx congested. Right vocal cord appears to be fixed in a position between adduction and full abduction. Right arytenoid and right ventricular band much swollen. Epiglottis not swollen, but overhanging.

Pharyngeal Cyst.—W. Douglas Harmer.—A man, aged twenty-eight, was first seen in 1904 with an inflammatory swelling over the right lower jaw, which was probably due to dental causes. This was incised in July and again in September, a piece of bone being removed from the jaw on the second occasion. In 1907 he complained of pain in the right side of the throat and dysphagia; he was also slightly hoarse. Nothing abnormal was discovered. In 1909 the symptoms had increased, and a lump was first noticed on the right side of the pharynx. On swallowing, the swelling was displaced outwards by contraction of the pharyngeal muscles. The larynx was also displaced to the left by a rounded tumour, which filled the pyriform fossa. On its upper margin, close to the right border of the epiglottis, there were three small white nodules. Enlarged veins were seen in the mucosa covering the tumour. In November, 1909, an external incision was made by Mr. D'Arcy Power, and a thick-walled cyst was found in the wall of the pharynx, and removed. In 1910 the swelling reappeared, became suddenly painful and burst internally. The patient stated that he coughed up pus and was afterwards relieved. Since then the size of the cyst has varied from time to time. It is now larger than usual, and projects into the cavity of the larynx. The nodules have also increased in size.

The PRESIDENT said the case was a remarkable one; the cyst was of considerable size. Its site and the fact of its recurrence suggested a branchial origin. He asked what Mr. Harmer proposed to do with it.

Mr. HARMER replied that he thought it should be possible to dissect it away from the outside, and so remove the whole of it.

Thyroglossal Fistula.—Dan McKenzie.—This case was shown as illustrating two atypical features, namely: (1) the opening of the fistula above the hyoid bone, and (2) its situation well to one side of the middle line.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL
AND LARYNGOLOGICAL SOCIETY.

Held in the Western Infirmary, Glasgow, June 6, 1914.

DR. WALKER DOWNIE, *in the Chair.*

Report by DR. W. S. SYME.

Lupus of Soft Palate — Fauces, Pharynx, and Larynx. — **J. Walker Downie.**—Girl, aged sixteen, has been under treatment by chromic acid locally, and syrup of the iodide of iron internally, and is considerably improved.

Dr. LOGAN TURNER thought of trying in laryngeal cases the more recent method of setting free iodine electrolytically as had been carried out in the Finsen Institute. The patient is first given a large dose of sodium iodide, and two hours afterwards small pointed needles (the positive pole) are inserted into the tissue, and something like three to five milliamperes are passed through. The duration of the *séance* lasts about three to five minutes; the needles are then taken out and introduced into another part of the tissue. Very good results have been obtained.

Dr. BROWN KELLY remarked that he had seen the method employed by Mr. Douglas Harmer. The results were very good. It required rather an elaborate outfit. The electrodes were like brushes fitted for different parts; they were applied for about three or four minutes. A dose of 100 gr. of sodium iodide was given two hours before the application. A general anæsthetic was used.

Dr. SYME said the case was interesting in that there was no external evidence of lupus.

Paralysis of Left Vocal Cord.—**J. Walker Downie.**—Man, aged seventy-six. Huskiness since January last, which he attributed to "cold." No pain nor other discomfort. Radiography shows a clearly outlined dull area to the left of the middle line in the upper part of the mediastinum, probably due to the presence of a new growth.

Leucoplakia of Tongue and Buccal Mucosa of Long Duration. —**J. Walker Downie.**—Man, aged fifty-seven, has been under observation for over sixteen years, during which time the condition has spread very slowly.

Dr. KERR LOVE had had a case under observation for a much longer period. In it, during the last six months, the tongue had been removed for cancer. Twenty-five years ago he had treated the primary symptom, and had watched the tongue for ten or twelve years. There was a history of syphilis. Locally he had used a weak solution of perchloride of mercury in spirit. Wassermann was negative at the end of the anti-syphilitic treatment.

Dr. BROWN KELLY said he always avoided irritating applications, preferring a saline solution.

Dr. MACKENZIE BOOTH had had a case under observation for sixteen years; in it chromic acid had been used successfully.

Dr. ALBERT GRAY asked if anyone had made any systematic investigation or found the percentage of cases of leucoplakia which are preceded by syphilis? Had anyone ever known of cases which gave a negative Wassermann?

Dr. WALKER DOWNIE said his patient had a definite history of syphilis. Leucoplakia was regarded by Butlin and others as a predisposing cause of cancer, but here there was no evidence of any malignant process making its appearance after all these years. It might be that irritating applications tended to promote malignant changes.

Carcinoma of Ethmoid.—J. Walker Downie.—The patient was shown at the meeting in May, 1913.¹ The patient continues in good general health, but the growth within the nose has slowly increased in size in the interval.

Dr. J. S. FRASER said that the growth had evidently not increased so very much in a year, and he would be inclined to think it was well within the bounds of operation.

Dr. SYME remarked that the case illustrated what had been pointed out by other observers, that malignant disease of the nose and accessory cavities progressed very slowly and involved the glands late. He, like Dr. Fraser, would have been inclined to operate on this patient.

Dr. WALKER DOWNIE said operation had been under discussion. Sir George Beatson, of the Cancer Hospital, and Dr. Dalziel had been consulted; the former was against operation, while the latter said it might be attempted.

Radical Tympano-mastoid Operation in Patient whose Right Auricle and Cartilaginous Meatus had been, as the result of an Accident, displaced forward, with complete Closure of the Meatus.—Thomas Barr.—W. F.—, aged eighteen. Eleven years ago right auricle almost completely torn off by threshing machine. This resulted in the auricle and cartilaginous meatus being permanently displaced very much forward, with entire closure of the meatal opening. Two years afterwards a thin, foetid fluid began to escape from a minute orifice behind the displaced auricle. A year ago (after this exudation had gone on for five years, and had been attended by severe attacks of pain, with vertigo, sickness and vomiting) he first came under observation. The badly-smelling fluid bathed the surface, and an orifice from which it came could only be detected by a very fine probe, shown by a skiagram to be opposite the bony meatus. A free incision was first made through a considerable thickness of tissue down upon the osseous meatus, which was freely exposed and explored, when the fluid was seen to come out of a small perforation above and behind the short process, the rest of the membrane being intact. The artificial canal was maintained by firm gauze packing and thorough antiseptic treatment employed, but with no effect, after several weeks, upon the quantity or even the odour of the discharge. Ossiculectomy, followed by a course of daily antiseptic syringing, had no better effect. The radical mastoid operation, modified owing to the peculiar position of the auricle and meatus, was then carried out (November 14, 1913). The attic, aditus, and antrum were found occupied by cholesteatomata and granulation tissue; the antrum extended very far backwards. All the cavities were thoroughly dealt with and

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, p. 501.

afterwards packed. Result satisfactory. Artificial opening left nearly opposite the osseous meatus. The cavities have been quite dry for months, but there exists a desquamative tendency requiring occasional syringing after peroxide of hydrogen. Any remedy from this? Dr. Barr remarked that the case was satisfactory in regard to the cessation of all purulent discharge, but, as so often happened in radical mastoid operations, there was left behind a desquamative tendency which called for regular cleansing. If left alone a whitish epithelial layer forms over the cavities, difficult to get rid of and sometimes requiring to be gently scraped off. As is well known, if let alone, this tendency is apt to lead to the formation of laminated masses which may ultimately bring about a suppurative process. His object in bringing the case forward was in order to hear any suggestions for bringing about a more healthy condition of the epithelium in such cases. The application to the walls of the cavity of a solution of salicylic acid in glycerine and rectified spirit has been suggested, as also a mixture of iodine, iodide of potassium and carbolic acid in glycerine. He would like to hear the experience of members.

Dr. LINGGOW looked upon the excessive growth of the epithelium as due to the cavity not being freely exposed to the air. The meatus and the post-auricular opening should not be closed by cotton-wool.

Dr. SYME thought that probably there was a degenerative process in the epithelium caused by it having for a long time been in contact with purulent material, by which it proliferates unduly, and that in time it would recover its healthy process. He did not know that any treatment would be likely to do good.

Dr. GRAY's experience was, that in time, although it might take many months, it would come all right.

Acute Purulent Otitis Media; Bezold's Perforation of the Mastoid.—J. Galbraith Connal.—Man, aged twenty-eight. Discharge from left ear for five weeks before coming under observation. Very painful for the past fortnight. Examination showed small perforation in the tympanic membrane anteriorly. W.L. $\frac{9}{16}$. Brawny swelling in neck. Under chloroform; mastoid operation (Schwartz). Bone towards the surface somewhat sclerosed. Deeper, it was cellular in type. Carious opening about the size of a quill leading through to digastric fossa. Pressure on neck caused pus to flow into the mastoid wound. Counter-opening in neck. Later, pus was found to come from upper part of wound, and a few days afterwards the cells in zygoma and soft tissue over zygoma were opened up. Pus showed pure culture of streptococcus.

Dr. J. S. FRASER asked why the tip of the mastoid was not removed at the first operation. The lower part of the mastoid at the end of the Schwartz operation might be likened to the bottom of an egg, and was apt to get filled up with pus. If the tip was removed the condition soon healed up, because the soft tissue filled in and the wound closed. His experience of anterior perforation of the tympanic membrane was that they were rarely associated with mastoiditis. He had no recollection of a similar case to the present one. His cases of anterior perforations in the membrane had been associated with tubal conditions without mastoiditis.

Dr. GRAY remarked on the great frequency of streptococcal infection in these cases.

Dr. SYME said he also removed the tip of the mastoid in most cases

if there was any justification at all. The after-treatment was much shorter.

Pigmentation (? Anthracosis) of the Tympanic Membranes.—J. Galbraith Connal.—A. A—, aged sixty-seven, a coal-miner, came complaining of dulness of hearing and tinnitus. On examination the tympanic membranes were seen to be of a dark blue colour.

Dr. LOGAN TURNER said that one explanation of blue membranes was found in the high position of the jugular bulb. At a discussion many years ago in the old Otological Society someone showed a case of that kind, and pointed out that the explanation was the high position of the bulb, and reference was made to the danger in paracentesis. It was not the explanation in this case, as the blue discoloration involved the whole membrane.

Dr. KERR LOVE thought there was little doubt that the case was one of pigmentation due to coal-dust. In 1905 he described a case which occurred at the Glasgow Royal Infirmary, in which the membrane was spotted all over. He had reported six cases in the *Glasgow Medical Journal* of 1907. The condition was now fairly well recognised in the Infirmary. These cases were significant, not so much for the blue colour, as that they are generally associated with non-suppurative deafness, which he suspected, though he could not prove it, was sometimes due to dust of other kinds getting into the middle ear and setting up inflammation. He suggested that otologists connected with hospitals should get into touch with their pathologists and ask them to pass on the temporal bone of any miner on whom they made a *post-mortem* examination, so that the actual presence of coal-dust or pigmentation similar to that found in the miner's lung might be ascertained. The cases were not very important unless more information could be got on the subject.

Dr. ADAM said the condition was comparatively common. He did not know that it was specially associated with chronic catarrhal conditions.

Dr. SYME said, in connection with the other cause of blue membranes which Dr. Logan Turner had mentioned, he would remind the members that at a meeting of the Society three years ago he had shown some skulls which demonstrated the high position of the jugular bulb in some instances. In one or two it was so high as to hide the foramen rotundum, and he had seen examples where the roof of the jugular fossa was absent (the fault appearing to have been present during life). The danger of such cases in reference to paracentesis was evident.

Dr. CONNALL referred to another case of blue membranes at present under his care, also in a coal-miner, and also associated with chronic catarrhal changes in the tympanic cavities.

Injury to Larynx.—J. Galbraith Connal.—J. W—, aged twenty-six. Early in February, when boxing, he was struck a severe blow on the right side of the larynx. The blow caused him no pain, but a "feeling of choking" for about a minute. There was slight spitting of blood that night—never afterwards. There was no difficulty in breathing. When he awoke next morning he was very hoarse. There was a swelling in the neck externally, so that his collar caught on it. No difficulty in swallowing, but the mucous gathering in the throat gives him some trouble. On examination one fortnight after the injury the *left* side of the larynx was markedly hyperæmic and swollen. There was some clot lying on the vocal cord and about the mouth of the ventricle. The left

cord did not move freely. The right side of the larynx was hyperæmic, but only slightly so compared to the left side. Externally, there was a swelling to the left side of the thyroid, but not tender to touch. There was no evidence of fracture. At present the voice is much better, but there is a slight wavy irregularity in the outline of the left cord, with some impairment of movement.

Dr. WALKER DOWNIE remarked that in this case there was no evidence of fracture. Two years ago he reported four somewhat similar cases due to fracture from different causes. The fixation of the cord was due to swelling, not to a paralytic condition. In two of the cases the fracture of the thyroid cartilage was well seen by X-ray examination. In all four cases there was severe intra-laryngeal œdema with difficulty in breathing.

Chronic Purulent Otitis Media with Labyrinthine and Meningeal Symptoms. — J. Galbraith Connal. — W. L.—, male, aged eighteen, has had discharge from the left ear since childhood. Cause unknown. Ear never gave him any trouble till one week ago, when he felt pain in the left ear and behind the ear over the mastoid. Pain was so severe as to prevent him sleeping some nights. No sickness or vomiting; no rigors. Giddiness noticed three days before coming under observation. Examination of the left ear showed large perforation, with some granulations protruding. Discharge somewhat offensive. No swelling over mastoid, and not much pain elicited on palpation. W.L. $\frac{0}{15}$. Tuning-fork R. Weber to right side. C and C₁ are not heard by A C, but heard for short time by B C; C₁ not heard. Nystagmus on extreme deviation of eyes, more marked to the right side. Pupils moderately dilated and respond to light and accommodation. The optic discs, though a little red, were quite healthy in appearance. Syringing the left ear with hot water or cold water gave no reaction, but on syringing the right ear the reaction was marked. He was admitted to the hospital for observation, and on two days previous to operation was sick and vomited. Temperature normal. January 20: Radical mastoid operation. Antrum filled with cholesteatomatous material and pus. The fenestra ovalis seemed patent and lacking the footplate of the stapes. Facial twitchings were noted while working in the middle ear cavity. After operation he complained of headache, and on the third day after operation the temperature rose to 102.6° F. The following day (24th) 102.8°. On January 27 he still complained of headache, and yesterday of severe pain in the back, making him cry out. The temperature for the past few days has been variable—highest 100°, but rising this afternoon to 102.4°. Has been having aspirin, which helps his headache. Kernig's sign is marked. Lumbar puncture was done, and about 2 oz. of fluid withdrawn. The fluid was turbid and under considerable pressure.

Report (Dr. J. Shaw Dunn).—Films from the sediment show abundant polymorphonuclear leucocytes, but no organisms are found. Cultures remain sterile after forty-eight hours' incubation. Blood was withdrawn from the vein in the arm and allowed to stand in a sterile flask, and on the following day (28th) lumbar puncture was again done, some fluid withdrawn, and the blood-serum which had been collected from the previous day was injected into the spinal canal. To-day the headache has been easier, and the temperature has varied from 98° to 99.6° F. On February 2 it was noted: Yesterday, had pain in the head and back and abdomen; temperature 102.8° F. This morning temperature 100°, but no headache or backache. Kernig still definite. February 4: Complains of pain in the back and down the legs. Was very restless yester-

day. Temperature was 103.4° . Lumbar puncture was again done. Pressure of fluid much less and not so turbid-looking. (Dr. Shaw Dunn reports—"There is a fairly copious deposit of polymorphonuclear leucocytes. No organisms. No growth is obtained after forty-eight hours' cultivation.") February 10: For the past two days the temperature has been normal. No complaint of pain. Tongue clean. Sleeps well. From this date onwards the improvement in the general condition was progressive. There was a tendency for profuse granulations to form in the middle ear, and some weeks after the operation the granulations were removed and packing applied. The following morning facial paralysis was noticed, and this has not entirely disappeared. At present the middle-ear cavity is dry, but there is a small pouting granulation in the floor of the canal leading to a limited area of bare bone.

Dr. LOGAN TURNER said he thought the labyrinth should have been operated on, and that Dr. Connal was fortunate in securing the recovery of his patient without having carried out that procedure. The meningitis was probably post-operative, and it might not have occurred if the labyrinth operation had been performed. The patient had the symptoms of manifest labyrinth disease and also an open labyrinth; there was evidence of want of function on the same side, and nystagmus mainly to the opposite side; there was giddiness, sickness and vomiting, all in the presence of chronic middle-ear suppuration. He thought one was perfectly justified in draining the labyrinth on these facts. He did not know whether other members would agree, and was not anxious to push the matter, but he believed this was a case in which such an operation should be carried out.

Dr. J. S. FRASER agreed with Dr. Logan Turner. The hearing tests, as recorded, gave no proof that there was any hearing power left in that ear; the fact that the low-pitched tuning-forks were heard (?) by bone conduction did not show that there was any hearing. Anyone who has a case of chronic middle-ear suppuration complicated by labyrinth disease, and absence of the foot-plate of the stapes, and does not perform the labyrinth operation along with the radical mastoid operation allows the patient to run a risk of meningitis. Dr. Connal must congratulate himself on being able to add another to the list of cures of meningitis. It would be interesting if he would give a detailed list of the labyrinth cases in which he had performed the radical mastoid operation alone, so that it might be compared with another list where the labyrinth operation had been performed in addition.

Dr. BARR asked if Dr. Connal had tested the labyrinth functions by the caloric or other tests since recovery?

Dr. GRAY was not sure that the absence of the foot-plate of the stapes was not rather an indication against opening the labyrinth. He believed he might have operated on the labyrinth, but did not think the absence of the foot-plate of the stapes would have caused him to do so; it rather allowed the drainage of the labyrinth. It was possible that that might have been what had saved the patient.

Dr. PORTER agreed with Dr. Logan Turner and Dr. Fraser that the labyrinth ought to have been opened. It seemed to him that this was a post-operative meningitis, and had the labyrinth been opened and drainage given in that way there was a good chance of the patient not having a meningitis. He thought that before long everyone should record his experience on this matter; until that was done each man would hold his own opinion and not be convinced by one or two cases reported by another observer.

Dr. CONNALL, in reply, said the only point was that the lumbar puncture fluid was absolutely sterile to growth. That was a factor in holding them to the line of treatment adopted; they were quite prepared, however, had symptoms developed, to do the labyrinth operation. He agreed that the meningitis was probably post-operative. He had not examined the functions of the labyrinth since recovery.

Chronic Purulent Otitis Media—Cerebellar Abscess.—H. Whitehouse and J. Galbraith Connal.—T.G.—, aged fifteen, came to hospital on September 24, 1913, complaining of pain, noises, and deafness in left ear of about one week's duration. On examination a cicatrix was present over left mastoid, but no tenderness. There was a cicatricial condition of the membrana tympani, but the condition was dry. Two weeks later there was a slight purulent discharge from the ear. A week later still he presented himself at the dispensary, complaining of sickness and vomiting which came on at his work on the previous day. During the evening he had shivering for an hour and a half. He also complained that he had a cold in the chest for a week, and that the cough gave him pain in the left ear. *Previous history.*—About seven years ago he attended the dispensary for pain in the left ear with swelling over mastoid. This was incised. He remained well till about three years after, when he again attended with a swelling over mastoid, which was again incised. A radical operation was then suggested, but was not performed. Since that time there has been no discharge from the ear.

On admission to hospital on October 21, he appeared fairly comfortable and answered questions quite smartly. No complaint of pain, except on pressure, over left mastoid. There was swelling over mastoid region and fluctuation over the old cicatrix. No pus in meatus. No giddiness except when ear was syringed. Eyes: Coarse, nystagmus to left, fine to right; pupils equal and somewhat contracted. Ophthalmic examination: Optic discs pinkish and somewhat full, and the veins also, especially in the right, are full and somewhat twisted. The above condition is more marked in the right than in the left. Temperature, about 99° F.; pulse, about 80. Chest: Moist musical *râles* over back and front; not much cough; no expectoration. Kernig's sign cannot be demonstrated. Tongue dry and furred. Sordes on lips. On October 22 severe pain in left ear and side of head; frontal headache. The temperature ranged from 99.6 to 102.6° F.; pulse from 80 to 90; respirations from 20 to 26. October 22: Radical mastoid operation; carious opening in cortex from which pus exuded. Antrum filled with cholesteatomatous material and pus. Lateral sinus lying exposed for about half an inch and covered with ragged granulations. Tegmen tympani and tegmen antri intact. Small portion of dura was exposed over tegmen antri and found normal. 26th: Complains of frontal headache almost constantly; during night awakened by it; nystagmus to both sides more marked than before operation. 29th: Frontal headache continues; no sickness; expresses himself as feeling better; nystagmus marked. 30th: General headache all over; sick, and vomited once at mid-day; apathetic appearance; looks very ill. 31st: General headache continues; yawning three times noticed; drowsiness. 31st (8 p.m.): Second operation (J. Galbraith Connal). The sinus was further exposed and defined, the bone internal and anterior to the sinus removed, and the cerebellum exposed in this region. A large abscess cavity was opened and about 3 to 4 drachms of pus liberated. At Dr. Thomas Barr's suggestion, a counter opening was made behind the sinus in the inferior occipital fossa and a drainage-tube inserted.

Lumbar puncture: Report on cerebro-spinal fluid.—The sediment consists of large numbers of polymorphonuclear leucocytes, a few desquamated endothelial cells, and scanty Gram-positive diplococci. The patient's condition improved for two weeks, when he became restless and temperature became irregular. The drainage-tube, which had been shortened, was reintroduced deeply, and after a week he again improved and made an uninterrupted recovery.

Dr. J. S. FRASER said drainage-tubes were used in this case. He did not know what the experience of other members was as regards tubes in abscess cases, but his own was limited and bad. On removal of the drainage-tube a flow of pus follows; just what one would expect. The brain is a very soft structure, and the intracranial pressure forces the brain up against the wall of the drainage-tube so that half an hour after insertion the tube ceases to be a tube and becomes a plug. Gauze is the best material for draining brain abscesses.

Dr. LOGAN TURNER remarked that this was a very important case for inner-ear investigation, but that had not been done.

Dr. WHITEHOUSE replied that gauze was passed through the tube.

Abstracts.

PHARYNX.

Strauch, August.—Cough Arising From a Persistent Thyro-glossal Duct. "Munch. Med. Wochenschrift," Nr. 8, 61 Jahrgang.

Though no mention is made of it in the literature of the subject the author shows conclusively that an irritable condition of a persistent thyro-glossal duct may be responsible for the production of a so-called nervous cough, and that in cases of this nature in which other causes have been excluded the surgeon should never fail to examine the foramen cæcum with a probe. Bochdalek found a persistent lingual duct twelve times—often with branched ramifications—amongst fifty tongues specially examined. This factor in the ætiology of reflex cough was first described by T. W. Lewis, of Chicago, who demonstrated three cases in which the cough persisted—in one case for many years—in spite of every effort made to cure it, but in which it finally and completely disappeared after the disinfection and cauterisation of a persistent duct. The author adds an equally conclusive case in which, however, it was necessary to totally destroy the duct.

J. B. Horgan.

Greene, J. B.—Diagnosis and Treatment of Diphtheria. "Annals of Otology, etc.," xxii, p. 782.

The author emphasises the following points: (1) The diagnosis of diphtheria depends primarily on finding the organism. Cultures should be taken of every sore throat in children, and likewise suspicious nasal discharges. But in the absence of a positive finding, if the symptoms point to diphtheria, antitoxin should be given. This is particularly important if the symptoms are severe. (2) Much larger doses of antitoxin should be given in diphtheria. Text-books have been misleading in this respect. (3) Laryngeal cases are serious partly from mechanical obstruction, requiring prompt relief of the stenosis, and large doses of antitoxin. Intubation in the main is preferable to tracheotomy. Laryngologists should perfect their technique in this operation until it becomes a fairly

simple one. (4) Epidemics of diphtheria are kept up largely by "carriers." They should be sought out, isolated, and the abnormality treated. Diseased tonsils and adenoids may require removal.

Macleod Yearsley.

Layton, T. B.—Tonsils and Adenoids in Children: A plea for fewer Operations. "The Lancet," April 18, 1914, p. 1106.

The author starts with the safe assumption that the two indications for removing tonsils—faucial and pharyngeal—are because they are the cause of some inflammatory lesion, or because they are causing some mechanical obstruction to the functions of the nose, mouth, or ear. In estimating, the latter two fallacies must be eliminated, the arrival at a conclusion just after an acute attack has got better or before any other source of septic infection has been removed. Both these fallacies are the cause of a large number of unnecessary operations.

The importance of carious teeth is dwelt upon, as well as of breathing exercises and attention is given to the risks of operation. The paper is a well-thought-out and common-sense contribution to the subject.

Macleod Yearsley.

NOSE.

J. Christ (Wiesbaden).—Nose and Ear in cases of Congenital Defect of the Sweat Glands (A Contribution to the Ozæna Question). "Zeitschr. f. Laryngol.," Bd. 6, Heft 3.

This appears to be the first of the papers in connection with the investigation on the subject of ozæna. It has evidently been published in support of the German theory that ozæna is due to a congenital tissue weakness of the bony framework of the nose.

Christ points out that five cases have hitherto been recorded of marked hypotrichosis and hypodontosis (the author is a dentist) combined with congenital defect of the sweat glands. One of these cases (American) was insufficiently described but the other four were recorded by Germans, and, of these, two have had malformation of the auricle and ozæna. Two of the cases showed albinism. Christ points out that ozæna is common in regions where there is endemic cretinism, and further that albinotic animals are almost completely deaf from degenerative changes in Corti's organ due to a congenital trophic disturbance.

The paper is a long one and the reasoning is rather loose, but the idea seems to be that an alteration in the internal secretions due to puberty, bad surroundings, etc., may, through the sympathetic nervous system, bring about trophic changes in various parts, including skin, nose, etc.

J. S. Fraser.

Emerson, F. P.—Atrophic Rhinitis with Ozæna: Its Ætiology and Surgical Treatment. "Annals of Otology, etc.," vol. xxii, p. 333.

Describes eight cases, and concludes that ozæna is the sequel of a focal infection. Clinically the course of events is: A septal deviation causes a compensatory hypertrophy of the middle turbinal. This is followed by a chronic catarrhal ethmoiditis which interferes with the drainage to such an extent that a subsequent active infection results in a sinusitis. The fœtor and crusting are probably due to the direct action of a specific pus-producing organism on the tissues, without any preceding true atrophic process. The difficulty in establishing free drainage, where there is an abnormal anatomical development of the

bony cells, makes the cure of certain cases of ozæna impossible without any intra-nasal procedure. Whatever aid bacteriology may give us in curing this disease must follow the free drainage of all foci of infection.

Macleod Yearsley.

LARYNX AND TRACHEA.

Panconcellia-Calzia (Hamburg).—The Autophonoscope: An Instrument for enabling the Surgeon and the Patient to observe at the same time the movements of the Larynx. "Zeitschr. f. Laryngol.," Bd. 6, Heft 3.

Garcia's method of examining the larynx has certain disadvantages, *e. g.* gagging, rapid clouding of the mirror, the method is difficult for the beginner, etc. The direct method of examining the larynx is almost useless for observing phonatory movements.

The writer gives Hays the credit for discovering the endoscopic method and refutes the claims of the Germans who try to make out that Zaufal and Trautmann had already discovered this method. Flatau, Haiké, Schmukert, Beck and Kahler have all modified Hays's instrument. Endoscopy has the following advantages: The instrument is easy to manipulate and does not cause retching. The instrument itself acts as a spatula, and the examination, which may last ten minutes or more if necessary, can be carried out with the mouth closed or open. Calzia uses the Flatau model which is now modified so that not only the observer but the patient himself can at the same time observe the movements of the larynx during normal breathing, forced breathing, coughing, swallowing, various methods of attack, chest and falsetto tones, whispering voice, etc. One regrets to note that the instrument has been patented.

J. S. Fraser.

Robert-Leroux.—Autostatic Ortholaryngoscopy. "Arch. Internat. de Laryngol., etc.," Jan.-Fev., 1913.

The study of Killian's suspension laryngoscopy suggested another method less alarming for the patient, of which the armamentarium is much more simple and correspondingly much less costly. Robert-Leroux, while retaining the principle of Kirstein and Killian's method, dispenses with the upkeep of apparatus and does not employ "suspension."

The necessary instrument for this purpose consists of a self-retaining mouth-gag (by Bruneau, Paris) in combination with a special tongue spatula, the end of which is insinuated as far as the glosso-epiglottic folds. A ratchet movement causes the tongue to apply itself to the floor of the mouth. This draws the epiglottis forwards and gives a clear view of the whole laryngeal region.

There are no practical details in the present paper, but one of the illustrations shows the patient with the head inverted and the jack-mouthgag *in situ*. Robert-Leroux is seated comfortably at the patient's head, which is supported by a rest, and an excellent view of the larynx is apparently obtained.

J. D. Lithgow.

Franck, O.—Personal Experiences of the Transverse Incision in Tracheotomy. "Münch. Med. Wochenschrift," Nr. 17, 61 Jahrgang.

The advantages claimed for transverse incision of the skin and trachea in this operation are that the method is easier and quicker, that the tracheal wound gapes and in consequence allows of an easy introduction

of the tube—this applies especially to children—that the cosmetic result is better and the dangers of immediate and remote complications from the operation are considerably reduced.

The technique is as follows: After transverse incision of the skin the muscles are separated along the linea alba and the isthmus thyroidea displaced downwards with the left forefinger. Then without employing any special means of fixation, the trachea is incised horizontally directly beneath, and as close as possible to, the lower border of the cricoid. The wound gapes and the tube can be gently slid into position. The skin-wound should be sutured with precision and every effort made to preserve strict asepsis.

J. B. Horgan.

EAR.

Krüger, Dr.—On the Treatment of Othæmatoma. "Münch. Med. Wochenschrift," No. 11, 61 Jahrgang.

After aspirating the contents of the hæmatoma, which he previously paints with iodine tincture, the author overcomes the difficulty usually experienced in applying firm and constant pressure on the injured part in the following manner. A very thin layer of cotton-wool is moulded over the inner surface of the auricle, all depressions being obliterated with a forceps, the whole being then painted over with collodium which latter should extend on to the healthy skin. This dressing, which is repeated when required, renders it impossible for the effusion to reform.

J. B. Horgan.

Schwarz, Adolf.—A Rapidly Acting Inhalation to Relieve Earache. "Monatss. f. Ohren," Year 48. No. 3.

The author has noticed that the inhalation of the ol. sinapis æthereum will stop toothache, and arguing from this that pain in other regions also supplied by the trigeminal nerve might be similarly relieved, has investigated its effect on various aural lesions. Brief notes of forty-four cases are quoted which include acute otitis media, external otitis and furunculosis, otalgia in connection with tabes and where no cause could be assigned, tinnitus, and pain associated with the convalescence after radical operations. In all these cases the use of this volatile oil was found to relieve or cure the discomfort and pain, and in the first-mentioned group when paracentesis became necessary it was carried out apparently without feeling.

The method adopted by Schwarz consists in placing some 5 grm. of the oil in a 20 grm. bottle, the opening of which is held under the nostril on the affected side, and the patient is instructed to close the mouth and eyes to occlude the other nostril and then take a short, but strong sniff. The effect, when it does take place, "is immediate." Apart from this latter suggestion that the method may sometimes fail there is no instance given where relief was not obtained.

Alex. R. Tweedie.

Bryant, W. Sohier.—Clinical Indications for the Mastoid Operation. "Annals of Otology, etc.," vol. xxii, p. 482.

Reduces the indications to four: (1) Operate when mastoid abscess is present. (2) Operate on mastoiditis due to streptococcus mucosus. (3) Operate in the presence of intra-cranial or hæmic complication of middle ear infection. (4) Operate on mastoiditis, acute or chronic, when the bone is of the solid variety.

Macleod Yearsley.

Mann, Max.—**A New Symptom of Cerebellar Abscess.** "Münch. Med. Wochenschrift," Nr. 16, 61 Jahrgang.

In two consecutive cases of cerebellar abscess Mann has demonstrated a marked disinclination of the patients to use the limbs that were homolateral to the side on which the abscess existed. This was especially noticeable if the patient were irritated in some manner, for instance, by holding the nose, whilst in a somnolent condition and was not demonstrable in cases of cerebral abscess. The suggestion is made that other surgeons who see cases of this comparatively rare affection might ascertain the frequency of this symptom and so establish its importance for the purposes of differential diagnosis.

J. B. Horgan.

Kirchner, Carl.—**Fractures of the Base of the Skull with Implication of the Mastoid Process and their Treatment.** "Munch. Med. Wochenschrift," Nr. 10, 61 Jahrgang.

A basal fracture involving the mastoid or petrous bone is more liable to occur if the injured skull is inelastic or the mastoid process sclerotic. Such a fracture remains a potential source of infective meningitis or sinus thrombosis for a considerable time, the exuded blood in the tympanic cavity, which is slow of absorption, being infected by way of the Eustachian tube or the ruptured tympanic membrane. This infection may remain latent until the occurrence of a sharp rise of temperature and violent headache point to the seriousness of the patient's condition. Such cases with a fatal termination have been observed several months and even years after the injury.

The diagnosis is often difficult. Apart from rupture or hyperæmia of the tympanic membrane and the exudation of blood in the tympanic cavity the patient complains of headache, vertigo on stooping or exertion, general lassitude and marked tinnitus. There is, further, in some cases, marked photophobia and dread of noise, a burning feeling in the face and accelerated pulse—symptoms which Friedmann has described as a vasomotor symptom complex. Müller's symptom, which consists in a hyperæmic condition of the tympanic membrane and the deep parts of the external auditory meatus, is present according to Rhese in 65 per cent. of these cases for months or even years after the injury. Radiography will furnish some information and Goebel states that the percussion note is duller on the affected side.

The author puts forward a strong plea for immediate operation in all cases of basal fracture in which there is any question of the fracture implicating the middle or inner ear. In the former case a simple antrotomy will suffice, in the latter the complete radical operation with labyrinthotomy.

J. B. Horgan.

ŒSOPHAGUS.

Amersbach, K. (Freiburg i Br.).—**Injuries of the Gullet during Œsophagoscopy.** "Archiv. für Laryngol.," vol. xxviii, Part 3.

The writer gives a detailed report, with post-mortem examination, of a case of carcinoma of the gullet at the level of the bifurcation of the trachea, in which a perforation occurred at the upper end of the œsophagus during an œsophagoscopic examination, carried out apparently with all due care by an experienced surgeon. A retro-œsophageal abscess developed and the patient died of inhalation pneumonia.

While accidents of this kind are certainly not very rare (according to Jackson, 1 per cent. during simple œsophagoscopy), it is to be regretted

that the number of published cases is even smaller than might have been expected; in this way is lost much information that would doubtless prove to be of great interest and value.

Thomas Guthrie.

Janeway, H. H. (New York).—The Early Symptomatology of Cancer of the Œsophagus. "Amer. Journ. Med. Sci." April, 1914.

The writer has been impressed with the difficulty which is experienced by the profession in recognising the early symptoms of this disease. Richard Cabot recently stated that among 3,000 cases coming to autopsy a greater proportion of mistakes was made in the diagnosis of cancer of œsophagus than in any other condition. And yet we have in œsophagoscopy a means of arriving at a correct diagnosis of œsophageal affections immediately their presence is suspected.

Dr. Janeway has operated on four patients with cancer of the thoracic portion of the œsophagus, and in each of them he was strongly impressed with the idea that, had they been examined at an early stage of the disease, favourable conditions for resection would have been found. If, therefore, any advance is to be made in the treatment of this disease, early diagnosis is of the greatest importance, and in this connection it is of interest to consider what are most commonly the first symptoms of the disease. The author's statistics bear out the usual statement that dysphagia is the earliest symptom, but it is not generally appreciated that the dysphagia may be at first only temporary, and that after being present for a short period it may disappear for a considerable length of time before becoming permanent. In other cases dysphagia is neither an early nor a prominent symptom, and exceptionally it may be absent throughout the whole course of the disease. The early symptoms, then, consist either of constant dull pain behind the lower end of the sternum, a tickling sensation in the throat, cough and increase of the amount of mucus in the throat, or in some cases anorexia alone.

Thomas Guthrie.

MISCELLANEOUS.

Freudenthal, W. (New York).—A New Method of producing General Anæsthesia. "Archiv. für Laryngol.," vol. xxviii, Pt. 3.

While all forms of inhalation anæsthesia present greater or less inconvenience in connection with throat work, the author has used with much satisfaction the method of intratracheal in sufflation by means of Charles Elsberg's apparatus. The latter is, however, expensive and cumbersome, and therefore is less suited for private practice than for a large hospital.

He was in consequence glad to meet with a new method devised by Dr. J. T. Gwathmey, of New York, which resembles the intravenous method in that the air passages are not interfered with, and has the additional advantage that a single application is sufficient to render the patient insensitive throughout the whole duration of the operation. This is a form of rectal etherisation, not, as in the method of Cunningham, by the continuous insufflation of ether vapour, but by a single injection of a mixture of ether and olive oil.

An hour before the operation a subcutaneous injection of morphia and atropin is given, and this is followed in half-an-hour by a rectal injection of '3 to '6 grams of chloretone. The apparatus for the induction of anæsthesia consists of a narrow catheter with glass funnel attached, through which the fluid is poured. The catheter is passed 8 or 9 cm. into the rectum, and a mixture of 2 oz. of olive oil and 6 oz. of ether allowed

to run in very slowly, so that the process occupies at least five minutes. In from ten minutes to a quarter of an hour later anaesthesia is complete, and the catheter is withdrawn. An operation lasting one and a half to two hours may now be performed without a further administration. Should the patient become at all cyanotic, or his breathing laboured, a catheter is passed into the rectum and 60 c.c. of the fluid allowed to escape, on which he rapidly returns to normal. When the operation is completed the fluid remaining in the rectum is removed by re-introducing the catheter and, if necessary, employing some form of suction apparatus.

The method proved an ideal one in most of the writer's cases. In one or two, however, it had to be supplemented by a small quantity of chloroform given in the ordinary way, and he has not usually found it satisfactory in children.

Thomas Guthrie.

REVIEW.

The Diseases of the Nose, Throat and Ears of Children in Daily Practice.

By Prof. Dr. F. GÖPPERT. Berlin: v. Springer. Pp. 166.

The title will probably at once raise the question in the minds of most as to the necessity for such a treatise, all the more so as it forms a special volume in the "Encyclopædia of Clinical Medicine." It is certainly difficult to realise that there is so much peculiar to children in aural and naso-pharyngeal ailments as to warrant a special work on the subject, and one's opinion will not probably be affected after reading this book. Those general practitioners who are not overcome by the terrifying series of maladies here described as affecting the child's nose, throat or ears, may easily slip into the error of thinking that they possess special knowledge of pathology and treatment of these parts, if they happen to overlook the occasional warning that under such and such conditions the case should be handed over to the aurist or rhinologist. This is the result of the *cade mecum* style on which the book is arranged, though this is more or less concealed by lengthy descriptive efforts. For instance, under "Naso-pharyngitis in Infants at the Breast," to which over thirty pages are devoted, there is a special chapter on the "Constitutional Effects of Naso-pharyngitis"; under this again there are other headings, the first mentioned being naso-pharyngitis and the nervous system, and finally this is divided into the subsections loss of rest, loss of appetite, habit spasm, to the first two of which are attached clinical notes of cases to illustrate the condition. On the other hand, the chapter on "Surgical Treatment of the Complications of Middle-ear Suppuration" describes polypi, mastoid disease, extradural abscess, sinus thrombosis, brain abscess and labyrinth disease, all within a page and a half! And one breathes a sigh of relief to find here a suggestion that treatment for these conditions should be confined to the aural surgeon.

It may be uncharitable to judge the work with no knowledge of the rest of the series of which it forms a part, but taken itself anyway it cannot be recommended either for purposes of reference or as a practical guide.

A. R. Tweedie.

NOTES AND QUERIES.

Dr. John Macintyre, of Glasgow, has been promoted a Knight of Grace of the Grand Priory of the Order of the Hospital of St. John of Jerusalem in England.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

OCULO-MOTOR PARALYSIS OF OTITIC ORIGIN.¹

BY F. H. WESTMACOTT, F.R.C.S.ENG., B.Sc.VICT., ETC.,

Hon. Assistant Surgeon, Manchester Royal Infirmary; Hon. Consulting Aural Surgeon, Manchester Children's Hospital and St. John's Hospital for the Ear, Manchester.

INTERFERENCE with the function of the third cranial nerve may occur in one of three parts, according to the symptoms produced.

Firstly, in the nuclei of origin in the grey column in front of the aqueductus cerebri and the corpora quadrigemina, together with the supra-nuclear portion.

Secondly, in that portion which extends from the point of exit of the united bundle of fibres on the medial side of the cerebral peduncle, just in front of the pons, passing forwards between the posterior cerebral and superior cerebellar arteries to pierce the dura mater beside the posterior clinoid process, in the small triangular space between the free and attached borders of the tentorium cerebelli. Beneath the dura mater the nerve courses through the lateral wall of the cavernous sinus until it enters the orbit through the superior orbital fissure.

Thirdly, from its entrance into the supra-orbital fissure and orbit, where it divides, to the terminations of its distribution. It is considered, however, that all lesions below the nuclei are peripheral, all above are cerebral. Landolt classifies all peripheral lesions as orbital (including supra-orbital fissure), basilar, and fascicular, the cerebral as subcortical and cortical.

¹ Read at the Clinical Congress of Surgeons, London, July, 1914.

It is with the second division, or basilar, that the otogenic lesions are intimately concerned, but it is also in this portion that the rhinogenic diseases affect the nerve-trunk.

It is necessary that some account must be taken of the latter, as well as the concomitant affection of the other oculo-orbital nerve-trunks, in order to discuss the differential diagnosis of paralysis induced by disease of the auditory organ in the temporal bone from that originating in neighbouring parts. The number of otogenic and rhinogenic lesions of the oculo-orbital nerves which have been published is small, but of these the latter are numerous and the former rare.

It is necessary to recall the anatomical relationships of the oculo-orbital nerves to the temporal bone to appreciate the pathological changes which may affect each nerve. All the nerves are situated near the apex of the petrous portion, and well out of the way of disease limited to the organ of hearing, but extension of disease by bone or soft parts will have different results. The largest area of contact is that of the trigeminus, which lies in a depression on the anterior and superior surface of the apical region of the petrous bone; the Gasserian ganglion and the three divisions of the fifth nerve being held in position by the dura mater, which is divided, and forms the cave of Meckel, the inferior portion forming the periosteal covering of the Gasserian impression, while the upper is closely connected with the tentorium cerebelli, and with the dura of the cavernous sinns and the dorsum sellæ.

The next most extensive relation appearing at the pyramid and posterior border of the pons is the abducens, which pierces the dura mater in the posterior fossa postero-laterally to the dorsum sellæ, entering the cavernous sinns medial to the fifth nerve, to reach the superior orbital fissure on a lower level and deeper than the oculo-motor. It is in immediate proximity to the petro-occipital suture, the inferior petrosal sinus, and the apex, for a distance of about 3 cm. Dorello describes a narrow cleft in which the abducens runs along with the inferior petrosal sinus, and is firmly bound down to the apex of the pyramid by connective tissue and dura as well as the petro-sphenoidal ligament. The fourth nerve passes into the dura and cavernous sinns at the anterior attachment of the tentorium cerebelli, just above and to the inner side of the trigeminal nerve, but external to and above the abducens. It lies inferior also and enters some distance behind the oculo-motor.

The oculo-motor nerve is relative to the temporal bone in the

second of the divisions described above, namely, the extra-dural portion and its continuity through the external wall of the cavernous sinus, being separated from it posteriorly by a thin membrane, whilst in front it lies in the blood stream. It is, however, the most distal relation of the oculo-orbital nerves from its superior position in the sinus. It is in this situation that it gets communicating fibres from the sympathetic plexus surrounding the internal carotid artery, which passes upwards at the apex of the petrous bone, close to the third nerve in the cavernous sinus. It also receives sensory fibres from the ophthalmic division of the fifth nerve.

Paralysis of the several ocular muscles may be simply classified according to the groups of muscles affected, as follows :

(1) Unilateral partial ophthalmoplegia or paralysis of certain muscles of one eye.

(2) Unilateral total ophthalmoplegia or paralysis of all the muscles of one eye.

(3) Bilateral partial ophthalmoplegia.

(4) Bilateral total ophthalmoplegia.

Ophthalmoplegia may be complete or incomplete according to extent of function interfered with.

Unilateral partial ophthalmoplegia is produced by paralysis of the oculo-motor nerve, and two distinct forms are found :

(1) External ophthalmoplegia. The external muscles of the eyeball are alone affected, excluding the lateral rectus and superior oblique.

(2) Internal ophthalmoplegia, in which the internal muscles, the sphincter of the pupil and the ciliary muscle are paralysed.

External ophthalmoplegia is due to a lesion in the oculo-motor nucleus at its inferior portion, whereas internal ophthalmoplegia is caused by a lesion in the upper or anterior part of the column of origin of the third nerve, the most anterior nuclear group giving origin to the nerve fibres supplying the levator palpebræ superioris. Either an internal or external ophthalmoplegia may follow the other from extension of the lesion.

An internal ophthalmoplegia sometimes arises from a lesion inside the orbit due to affection of the short root of the ciliary ganglion, but here is found, in addition, a paralysis of the inferior oblique muscle, and is frequently due to disease in the ethmoidal cells. Paralysis of all the muscles supplied by the oculo-motor nerve, without other muscles being implicated, is caused by a nerve lesion before its entrance to the cavernous sinus, a distance varying

from 2 to 3 cm., and it is usually in this position that disease of the auditory apparatus and temporal bone will attack the nerve by continuity.

In the cavernous sinus it is probable that the fifth, fourth, and possibly the sixth nerves will be affected, according to whether the pressure is from within the cavernous sinus due to thrombosis or aneurysm of the carotid artery, or whether the pressure is on the external sinus wall.

Disease of the sphenoidal cell is frequently in causal relationship with this manifestation, since the cavernous sinus and its contents are in close contact with the outer wall of the sphenoidal cavity, in varying degrees, as described by Onodi (1). In the superior orbital fissure the nerve lesion would be accompanied by damage to the other oculo-orbital nerves. In both situations there would be unilateral total ophthalmoplegia. If, however, a lesion affected all the nuclei of the oculo-motor nerve, there would be two additional factors, firstly, the crossed fibres passing to the other eye would be affected, producing a bilateral partial ophthalmoplegia, and secondly, the fibres arising from the seventh nucleus to the orbicularis oculi, close to the origin of the fibres of the levator palpebræ, being attacked would cause paralysis of the orbicularis, with absence of the usual symptom in complete oculo-motor paralysis—that of the raised eyebrow on the affected side. A further point of importance would be the presence of abducens paresis, or paralysis, of the opposite side (associated fibres). Slight affection of the lateral rectus and superior oblique is sometimes observed in total paralysis of the third nerve, demonstrated by the field of fixation limitation in the lateral and infero-lateral part. E. Landolt (2).

Uhthoff has described a recurring ophthalmoplegia in neoplasm of the oculo-motor nerve trunk.

Total, but transitory, ophthalmoplegia with severe pain, headache, and vomiting may affect one or other eye, and is nuclear in origin, and spoken of in France as “migraine ophthalmoplégique.”

If paralysis of the oculo-motor occurs without affection of abducens and trochlear, and associated with paralysis of the opposite side of the face and body (symptom-complex of Weber), it is suggestive of a lesion on the inner side of the crus cerebri, and is generally due to syphilitic softening, but it may be due to a hæmorrhage, or tubercle arising in the temporal bone or base of the skull. The more complete the paralysis of the oculo-motor

nerve, the nearer the lesion is to the surface of the crus cerebri after concentration of fibres, and the greater is the lesion. If an irritative lesion exists in the crus cerebri, instead of paralysis there is limitation of the muscles supplied by the third nerve, and on the opposite side of the body contraction or tremors of the limbs, producing what is known as the Benedikt-symptom-complex.

Unilateral total ophthalmoplegia can only be caused by a lesion in the orbit, the superior orbital fissure, or in the cavernous sinus. In the region of the superior orbital fissure it is generally syphilitic. Owing to a thin wall of the sphenoidal sinus and the possibility of dehiscences it may be due to suppuration in that cavity. In cavernous sinus thrombosis there are symptoms of venous congestion, and when there is exophthalmos with pulsation it indicates an arterio-venous aneurysm from rupture of the internal carotid into the cavernous sinus.

Other causes of unilateral total ophthalmoplegia are hæmorrhage, exudations, sinus empyema, neoplasms, foreign bodies such as bullets, and thrombosis of orbital veins or veins going to the cavernous sinus from the sphenoidal cavity.

Bilateral partial, or bilateral complete ophthalmoplegia are nuclear in origin or due to basal neoplasms.

As regards the causes of oculo-motor paralysis I shall limit the description as far as possible to those which arise directly or indirectly from disease of the auditory apparatus or temporal bone, and affecting the second division or basilar portion of the nerve—trauma. Bullets entering the temporal bone may cause division or direct pressure on the trunk of the third or other nerves, or indirectly by hæmorrhage or exudation or subsequent inflammation and suppuration in bone or meninges. Inflammation commencing in the middle ear or adnexa may spread by direct cellular continuity to the apex of the petrous portion of the temporal bone. There may be infection and direct extension of pathological processes, streptococcal or staphylococcal in origin, by continuity of tissues and by lymphatics along the vessels, especially the tympanic plexus, and nerves; hence a circumscribed meningitis may be set up and result in nerve pressure or infective toxæmia. Gradenigo was one of the first to establish this. Urbantschitsch first regarded the paralysis as reflex in origin, but this has never been proved except where disease is present in the labyrinth. Thrombosis of veins, more particularly the inferior and superior petrosal sinuses, spreading backwards to the cavernous sinus, may cause pressure on the oculo-motor nerve. The former is more likely to affect the

abducens which lies for some distance in contact with them, but thrombosis or periphlebitis may directly attack the third nerve, the specially vulnerable point of which is just before entry into the fold of dura mater split by the trigeminus and the cavernous sinus. An illuminating case which came under my care is worthy of review because it definitely illustrates the pathological sequence and association of middle-ear disease and oculo-motor paralysis, which is the rarest form of otogenic nerve lesion.

On November 22, 1912, I was asked to see a young lady of twenty-nine, when the following history was given:

"On November 14 she had a sudden attack of vertigo near a hot baking stove. She was inclined to fall, but recovered herself. About 8.30 p.m. she went out, but felt 'useless' and returned home. About 9 p.m. she vomited and was purged. Whilst in the bathroom she had an attack of vertigo, and fell, got up again, vomited again, and fell once more, striking her head, but did not know where. She thought it was the eye that had been struck when she found she could not open it. There was, however, no mark of bruise or injury. She was unconscious for sixteen hours, and vomited during that time. She felt no pain in the head or eye. No vomiting occurred after recovering consciousness. On November 21 Dr. J. Gray Clegg, an ophthalmic surgeon, was called in, and I am indebted to him for his notes on the examination of the eye.

"He found complete paralysis of the third nerve on the right side with ptosis. There was no proptosis and no pain in the eye, but some tenderness on pressure over upper part of eyeball. The external rectus and superior oblique were unaffected, the seventh nerve also. The fundus and retinal vessels were normal. He diagnosed pressure on the trunk of the third nerve behind the right orbit. He was told that she had had intermittent slight discharge from the right ear for some years, with a foul odour at times, also slight deafness on that side. There was no history of nasal discharge. The temperature was 99° F. He recommended examination by an aural surgeon. When asked to see her I found her in bed. She was able to answer questions, although she was in a dazed condition. She could hear the voice in an ordinary tone each side, but no specific hearing tests were applied. The nasal cavities presented no evidence of accessory sinus disease. The left ear showed some signs of old catarrhal otitis media. The right meatus was full of brown, soft cerumen and cholesteatoma. On removal of this by syringing, a perforation, $\frac{1}{8}$ th in. in diameter, was seen in the posterior superior quadrant, through which a drop

of pus exuded; the remainder of the tympanic membrane was white, thick and opaque, and the ossicles were not distinguishable. There was no pain in the ear nor tenderness over the mastoid process or head. The right eye demonstrated all the classical signs of complete paralysis of the oculo-motor nerve. There was ptosis of the right eyelid with very slight protrusion, divergent strabismus, with slight downward rotation; pupil moderately dilated and almost fixed; the right eyebrow was higher than the left. There was no headache or photophobia, but this was present in a slight degree some days later. The fourth, fifth, sixth and seventh nerves were unaffected. The eyeball could be moved outwards a little further than the rest position, showing the sixth nerve to be free. There was no rotation to the normal side, and upward and downward movements were limited. The right eyebrow was slightly raised above the level of the left one. There was no ecchymosis or œdema of the lids.

"On lifting the eyelid and testing the vision it was found that there was crossed diplopia. On placing an object on the axial plane necessitating turning the eyes to the extreme left, the false image was far to the left and inclined towards the affected side. When placed sagittally and below the false image was below and to the left of the true image; when placed upwards the false image was well above the true image. There was no nystagmus. On testing the pupil reflexes, the left one was found to be moderately small and contracted normally to light. The right pupil contracted very slightly, but there was no consensual reflex. Accommodation could not be tested.

"From the history and the symptoms present, I concluded there was pressure on the oculo-motor nerve, close to the dura mater triangular space before its entry into the cavernous sinus, and near to the apex of the petrous bone. The fourth nerve being free, the pressure was not exerted very far outwards and backwards. There was no intraorbital pressure, and the superior orbital foramen was free, because the fourth, fifth, and sixth nerves were unaffected. It was because of the cholesteatoma found and the drop of pus on its removal that I advised an exploratory operation through the mastoid antrum. The patient was removed to a nursing home. Menstruation had commenced the day before. After admission she was still drowsy, the temperature was 100° F., and the pulse 76; 3 gr. of calomel with castor-oil were given. At 6 p.m. the temperature was 101° F., pulse 92. She passed a restless night, and next day the temperature was 100° F., pulse 84, tension

normal, no albuminuria. Nerve reflexes were normal, Kernig's sign was absent. No headache or vomiting; no change in the eye symptoms. She became more drowsy during the day and night. Operation on November 24, 10.30 a.m. A post-aural curved incision was made. On chiselling through the dense cortex for one-sixteenth of an inch at the antral triangle, the lateral sinus was opened, and the vein seen pulsating. This was situated far forwards and close to the sloping wall of the posterior border of the external bony meatus so often observed in the diploëtic type of process. A second opening was made above this, and the skull cavity was entered, the dura mater being observed to pulsate feebly. The bone between this and the upper and posterior wall of the meatus was extremely dense. At a depth of $\frac{1}{2}$ inch from the level of the mastoid cortex the antrum was reached and found to contain pus and fleshy granulations. It was small, being about 4 mm. in diameter. On exploration an aperture was discovered in the roof, through which pus came after wiping out the cavity. This aperture was about 3 mm. across. It was enlarged, and about half a drachm of pus escaped. A track was found extending inwards for over $\frac{1}{2}$ in., and the bone was removed for that distance. The dura mater did not pulsate, and was greyish in appearance. As a little pus could be seen coming from the line of the superior petrosal sinus, a drain of gauze, about $1\frac{1}{2}$ in. long, was put in. The wound was packed after excising the posterior wall of the cartilaginous meatus.

"The temperature dropped to 98.6° F., pulse 92, at 2 p.m., and was 99.2° F. with pulse 88 the same evening. There was no sickness after chloroform, and she slept well the night after operation. Next morning the temperature was 98° F., and pulse 80. This condition was maintained till 6 p.m. on the 28th (fourth day), when the temperature reached 100° F., with pulse 100. She complained of a little headache during the previous night and all that day. She vomited once, at 6.45 p.m. About midnight she had a severe attack of general convulsions, lasting half-an-hour. There was evacuation of fæces and urine and a very dark menstrual flow. After the attack the temperature was normal, and pulse 80 and very difficult to feel. She was unconscious during the attack, but afterwards spoke rationally on questioning her, and complained of having had a terrible dream. The right eye and cheek were slightly cedematous. The ocular symptoms were the same, and there was no vomiting.

"The wound was dressed. There was recent blood on the

dressing and a little pus in the deep recess of the wound, but otherwise it was healthy. The sinus was pulsating. Bromidia dr. j was given and repeated in an hour. She vomited after the second dose, but slept well after a third dose. She slept a good deal day and night after this for several days.

"On December 1 the temperature rose to 101.8°F. , and pulse 98. She complained of a little frontal headache. The wound was healthy, and there was no pus. The oedema of the eyelid had almost disappeared. There was much constipation, although calomel was given every other day. Quinine and strychnina were also administered. The temperature was normal on December 3, and with the exception of a slight rise on December 7 and 8 it remained normal afterwards. She made a slow but uninterrupted recovery. I saw her again on January 20, 1913. She was able to get up and about the house, had recovered some of the use of the eye muscles, and the wound was almost healed. The eyelid could be half opened, and the false image was closer to the true image than before operation. I did not see her again till May 23, 1913, when she could walk well, but the diplopia confused her out of doors. The ptosis was hardly noticeable, and the strabismus slight but discernable. On the normal side the false image was a little to the left, and present still on looking upwards. The fundus was normal. The pupil was a little larger than the left, and reacted well to light and accommodation.

"*Hearing Tests.*—Rinne: Right and left, C to C3 negative; C4, positive. Speech: Right and left, 10 ft.; whisper, right and left, 9 ft. Weber's test lateralised to right. When C tuning fork was placed on the left mastoid it was heard on the right side, the sound appearing to go round the back of the head. Schwabach test: C right, 5 sec.; left, 3 sec. Watch: Right, 4 in.; left, 7 in. The right meatus was lined by healthy epithelium. Posteriorly, the scar showed slight depression only. I have seen the patient at intervals up to June 29th last, and she has kept perfectly well. There is no ptosis, and very slight diplopia on looking upwards only."

In this case the cause was primarily cholesteatoma, which had eroded through the tegmen antri, and set up a sub-dural abscess; the infection worked along the superior petrosal sinus, and so to the trunk of the oculo-motor nerve. It became acute and caused the rapid development of symptoms.

Tröltsch, Ostmann and Hilgermann, cited by Onodi (1), described similar extension to the petrous apex of purulent otitis

media, affecting the oculo-motor nerve. Scotti (1) observed destruction of the Gasserian ganglion from necrosis of the apex, after separation and extrusion of a sequestrum through the external auditory meatus. Bircher (1) found oculo-motor paralysis and irritation of the fifth nerve in phlebitis of the lateral, inferior petrosal and cavernous sinuses, which appeared after operation. Sikkel (1) records trigeminal neuralgia due to irritation of trigeminus and Gasserian ganglion in otitis media. Jansen (1) and others have described cases of lesions of oculo-motor, together with abducens, trochlearis and trigeminus in phlebitis and thrombosis of temporal bone venous sinuses. Sargnon records two cases of complete oculo-motor paralysis with brain symptoms where caries existed in the temporal bone, with disease of the outer wall of the cavernous sinus. Periodical recurrent paralysis of the third nerve has been reported by Wadsworth, Michel (3) and others in suppurative otitis media. Michel's case recovered after a free discharge of pus. Wadsworth attributes the phenomenon to inflammatory meningeal changes in the region of the oculo-motor. Eversbusch discusses the possibility of otogenic neuritic change, or of toxic inflammation in these cases, but such a purely toxic effect upon the nerve fibres has not been proved. Toxic neuritis is described by Gerouzi, Baldenweck, Lannois, and Perritière. A recurrent paralysis of the abducens has been observed by Chierici in purulent otitis media, which recovered on free discharge of pus, but reappeared twice afterwards. Abducens paralysis of otogenic origin has been described by several observers, such as Dorello and Baldenweck, some of which remained after operation and cure of the initial lesion (Krepuska). Perkins described a hundred cases of abducens paralysis, of which twenty-five appeared after operation, and in half the cases the Gasserian ganglion was involved. Dorello and Baldenweck point out a direct relationship between the veins of the tympanic cavity and of the inferior petrosal sinus, and of congenital dehiscences in the bone of the anterior wall of the tympanic cavity. Certain ocular reflexes have been observed from otogenic irritation, such as abducens paralysis by way of the vestibular nerve, but no record can be found of similar affection of the oculo-motor nerve.

Paralysis of the oculo-motor nerve has been recorded in temporo-sphenoidal and cerebellar otogenic brain abscesses. Lombard (4) believes that when signs of intra-cranial abscess are present in a suppurative otitis media, if there is oculo-motor paralysis it denotes temporo-sphenoidal abscess, while abducens paralysis

indicates cerebellar abscess. Tubercular or syphilitic disease of the temporal bone may produce oculo-motor paralysis, causing direct pressure on the trunk of the nerve. Otogenic paralysis of trochlearis has been recorded by Schwartze, De Laparsonne (5), and others. Jacques twice observed external ophthalmoplegia follow acute otitis media in infants, accompanied by ptosis; one died with all the signs of acute meningitis.

To sum up, it appears that otogenic paralysis of the oculo-motor and other orbital nerves is clearly established, but our difficulty arises when we endeavour to establish the pathological lesion present. When paralysis exists with an ipsilateral otorrhœa, accompanied by headache and vomiting, an exploration of the auditory apparatus should be at once undertaken to determine the extent and limits of the disease, whilst at the same time it should be borne in mind that the examination of the nasal fossæ and accessory cavities may reveal the focus of disease, in so much as nasal disease infection is far more common than aural infection in the production of paralysis of the oculo-orbital nerves.

REFERENCES.

- (1) ONODI.—“The Rhinogenic and Otogenic Lesions of the Third, Fourth Fifth, and Sixth Cranial Nerves,” *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1914.
- (2) LANDOLT.—“Etude sur les mouvements des yeux, etc.,” *Archiv. d'ophtal.*, 1881.
- (3) MICHEL.—*Lehrbuch der Augenheilk.*, 1890.
- (4) LOMBARD.—*Internat. Med. Congress*, 1908, Otologie.
- (5) DE LAPARSONNE.—*Société française d'ophtalmologie*, 1907.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE — SECTIONS OF NEUROLOGY, OPHTHALMOLOGY, AND OTOTOLOGY.

Combined Meeting, February 26, 1914.

Discussion on Nystagmus.

The discussion was preceded by a demonstration of cases illustrating the different varieties of the disorder.

(We select only those portions of the discussion which are of special interest.)

Mr. SYDNEY SCOTT: It is perhaps well to remark that normal or what one may speak of as everyday movements of the head suffice to stimulate the semicircular canals, setting up afferent impulses which are trans-

mitted to the basal nuclei, and so forth, and reflex influence the co-ordination of muscular movements, *not only of the eyes but of other parts of the body*. The ocular movements known as nystagmus are in most cases with which we are concerned in otology due to *excessive* stimuli applied to physiologically normal vestibular systems. When we meet with spontaneous nystagmus we have to consider the relation between the spontaneous and induced nystagmus. We shall first devote attention to induced nystagmus in so far as the ear is concerned.

Nystagmus produced by Syringing the Ear.—Irrigation of one ear with hot water when the head is erect will produce involuntary pleurothotonus towards the contra-lateral side, with rhythmic rotatory nystagmus towards the ipsi-lateral side. The direction of these reflex movements is reversed by keeping the head inverted during the progress of irrigation, and they can also be reversed by using cold water instead of hot, without inverting the head. The legitimate explanation is that, in accordance with the laws of heat, convection currents are set up in the endolymph, and that the direction of these currents determines the direction of the reflex movements. When the head is erect or inverted the currents would be induced in the superior semicircular canal, and this would account for the rotatory nystagmus. When the individual under examination lies with face upwards when the ear is irrigated with hot water, he will tend to roll towards the contra-lateral side, and horizontal rhythmic nystagmus will be noticed towards the ipsi-lateral side. If we use cold water instead of hot, the face remaining uppermost, the direction of the forced movements will be reversed. We can also reverse the direction of the movements by placing the head with face downwards during the procedure of irrigation with hot water, and again reversal of the direction of the reflex movements may be induced by employing cold water instead of hot, while the face remains prone. I have ventured to express the reactions in the form of a law based upon the convection hypothesis: "*The deviation of the head and eyes in the same direction as the current in the endolymph, and the nystagmus is in the opposite direction.*"

Nystagmus produced by Rotation.—The phenomena produced by rotation tests are in harmony with those produced by caloric tests, and are explicable by the laws of inertia and the production of currents in the endolymph.

The eye movements are of secondary importance compared with the primary movements of the head, trunk and limbs, which result from rotation stimuli. By attending only to the nystagmus we are studying only part of the reflex movements produced by labyrinthine stimulation.

Nystagmus produced by Galvanic Stimulation.—When the electrodes of a galvanic system are applied to one or both sides of the head, in the former case the one electrode being in a neutral position, a sustained current of 2 to 5 ma. is sufficient to provoke definite reflex movements of the head and trunk, but insufficient to provoke nystagmus. If the strength of the current is increased to 5 or 10 ma., or sometimes 15 ma., rotatory nystagmus will be set up in addition to the forced movements of the head and trunk. This mode of stimulus is occasionally of considerable value. It will be observed that the direction of the nystagmus varies with the position of the electrodes. When the anode is in contact with the head in the region of the ear, and the cathode is in the hand, on the back or on the other side of the head, the nystagmus is directed *away from the anode*. When the position of the electrodes is reversed, the nystagmus is *towards the cathode*. The anodal current gives a stronger stimulus than the kathodal current.

The responses to galvanism are observable in cases in which the labyrinth has been disorganised or removed, but the reactions are absent in cases of destruction of the vestibular nerve by a neoplasm.

Nystagmus produced by Meatal Compression.—Nystagmus can also be momentarily provoked occasionally in patients who have middle-ear disease associated with a fistulous communication between the middle and internal ears, by sudden compression of the meatal contents, provided the neuro-epithelium of the vestibular nerve is intact and that the local condition remains favourable for the transmission of sudden changes of pressure to the interior of the labyrinth.

Dr. Hughlings Jackson's Case, "Fistel Symptom."—It is now about thirty-five years ago since Hughlings Jackson described examples of nystagmus in association with ear disease. Schwabach in Germany, Blake, and later Kipp in America, also described cases about the same time. Hughlings Jackson's case was that of a woman, aged forty-nine, with suppurative disease of the ear. Digital compression of the meatal contents caused immediate giddiness, which was associated with deviation movements of the eyeballs towards the contra-lateral side. Rhythmic nystagmus followed, with the rapid component towards the ipsi-lateral side; some rotatory movement was also noticeable. Dr. Jackson did not have the opportunity of verifying the existence of a labyrinth fistula, but there can be little doubt that one did exist. The term "fistel symptom" is now employed to designate the phenomena resulting from meatal compression which Jackson described. During a period of about ten years I have met with only twenty-three examples of the "fistel symptom," but in nearly every case an opportunity occurred of verifying the actual existence of a fistula which generally led into the external semicircular canal.

Many cases of labyrinth fistulæ occur, of course, without being associated with the "fistel symptom," simply because the internal ear has already become disorganised and ceased to react, or because the fistula may be protected by epithelial accumulations which hinder the transmission of sudden changes of pressure from the middle to the internal ear, although the latter may retain its normal sensibility. Rarely the "fistel symptom" may appear about a month after the mastoid operation has been performed for chronic suppuration of the middle ear. At the time of the operation the semicircular canals and the vestibular walls may be quite intact, and it would seem that the sign develops with the appearance of vascular granulations upon the outer wall of the labyrinth. The gentlest possible application of a probe, in such cases, to the granular area over the external semicircular canal immediately provokes the nystagmus and also a sudden jerking movement of the head. It is several weeks before the sign disappears, and I have little doubt it arises from the formation of porous bone during the growth of granulations from the thin outer wall of the external semicircular canal. The "fistel reflex symptom" can be provoked not only with the probe, but by means of a Politzer bag, connected with the external auditory meatus with a rubber tube which accurately fits the meatus. Sudden slight compression of the rubber bulb, when the patient is seated erect, causes the head to be suddenly and involuntarily jerked about a vertical axis, the face turning away from the stimulated side; simultaneously the eyeballs rotate in the orbits in the same direction as the head. The ocular movements are more sensitive to the pressure than the head movements, so by carefully regulating the compression one may evoke ocular movements without head movements. It will then be seen that

each compression causes the eyeballs to oscillate horizontally. A very slight stimulus may cause undulatory horizontal nystagmus, a stronger compression will set up rhythmic horizontal nystagmus, and a still slightly stronger compression will introduce a rotatory element, so that we obtain combined horizontal and rotatory nystagmus. In each case the nystagmus is quite transient, lasting only a few seconds. In applying the test there is a possibility of forcing pus into the labyrinth and setting up diffuse labyrinthitis and risks of meningitis. One should be extremely cautious in the application of the test for the "fistel symptom."

Effect of Anæsthesia.—In considering the relation of the two components in labyrinthine nystagmus it is important to notice that the rapid or secondary component is abolished by general anæsthesia. One sometimes has the opportunity of observing the effect of direct pressure upon a semicircular canal fistula when operating for disease of the ear. If the labyrinth is active the eyeball moves in response to the pressure, not in an oscillatory manner, but by simply deviating to one side. Sometimes one may evoke alternate deviation movements by applying pressure alternately to a semicircular canal fistula and to the fenestra ovalis. In one case I was able to provoke at will alternate movements of the eyeball away from the stimulus when the probe was applied to the canal, and a movement towards the stimulus when the probe was applied to the stapedial fossa. One regards such alternate movements as being two separate primary reflex movements, the secondary reflexes being in abeyance so long as the patient is anæsthetised.

Spontaneous Nystagmus.—In discussing labyrinthine nystagmus, and comparing it with nystagmus associated with disease of the central nervous system, or of the eye itself, we concentrate our observations on nystagmus which occurs within the binocular field.

The less intense forms are sometimes seen in cases of acute or chronic otitis media. If the infection does not spread to and destroy the labyrinth, the nystagmus is restricted to the side of the infection. The nystagmus in these cases is usually transient, and may be overlooked. The complaint of giddiness leads one to look diligently for sustained nystagmus, although giddiness is experienced more frequently than nystagmus can be recognised. If one applies the tests for inducing nystagmus to such a case, the labyrinth in question appears to be hypersensitive. The existing nystagmus can be temporarily abolished or intensified, according to the test, more easily when the stimuli are applied to the affected ear than when applied to the other side.

Spontaneous rhythmic rotatory nystagmus to one side is also met with when the opposite labyrinth has become functionless. This form of nystagmus develops the moment the one labyrinth is destroyed, but disappears when both labyrinths become defunct. It does not usually occur in young children, and Sir Victor Horsley has pointed out its absence or very early disappearance in monkeys. In the adult human being this contra-lateral nystagmus is an invariable sign of unilateral ablation, and can be observed, if sought for, several weeks, months or sometimes years after the onset. It certainly tends to become less intense as time goes on, but is liable to be renewed in intensity temporarily whenever the patient's general health fails. In a few instances contra-lateral nystagmus, due to ablation of one labyrinth, is accompanied by a fine horizontal nystagmus toward the defunct side. Dr. James Taylor has pointed out the importance of observing well-marked nystagmus toward the diseased side with fine nystagmus to the contra-lateral side in cases of cerebellar tumour, and we should remember that the same sign is observed in cases of cerebellar or

extra-cerebellar abscess, which generally arise from an infection of the middle or internal ear.

Labyrinthine Nystagmus in cases of Absolute Blindness.—When the labyrinth is stimulated in cases of total blindness, due to a local cause, such as primary optic atrophy, and when the blindness is not accompanied by intracranial disease, rhythmic nystagmus can be provoked by rotation or irrigation in the usual way, but the primary component comes into greater prominence as the eyeball aimlessly deviates or rolls to one side in response to the labyrinthine stimulus. In the absence of retinal stimuli the patient is directed to look towards his own hand, which is passively held to the right or left as desired, and we shall then notice that the oculo-motor effort to deviate the ocular axes at once induces true rhythmic nystagmus, having characters similar to those met with in patients with normal vision subjected to the same tests.

Methods of Measuring the Strength of the Stimulus and the Intensity of the Nystagmus.—It is sometimes found that nystagmus can be more easily produced by stimulating one ear than by stimulating the other. Just as the knee-jerks are described as being equally or unequally brisk, sluggish or abolished, so may we describe the labyrinthine reflexes as being equally brisk, sluggish, or abolished. It is difficult to choose a criterion for briskness and sluggishness, and so to a great extent we have been satisfied by concluding that the labyrinthine reflexes are either present or absent. There is a possibility of estimating and recording degrees of activity by elaborating the following methods:

Rotation.—(1) Employing a constant stimulus: that is, constant rate and number of rotations and noting the duration of the nystagmus which follows the sudden stop. (2) Ascertaining the minimal number of rotations which induce nystagmus.

Caloric Method.—(1) By employing a constant temperature of the thermal agent and observing the period of induction before the onset of nystagmus. (2) By measuring the quantity of the fluid at a constant temperature which flows before nystagmus can be recognised. (3) By noting the extremes of temperature employed to provoke nystagmus.

Galvanic Method.—By observing the current in milliamperes which is required to induce nystagmus.

Dr. DAN MCKENZIE: *Vestibular Nystagmus.*—There are one or two points connected with the *physiology* I should like to touch upon. First of all, with regard to the mechanism by which rotation induces nystagmus, I agree with those who hold that the movement of the endolymph in the semicircular canal is never a steady round-and-round circulation. That there must be some movement of the fluid is undoubted, but the movement is that of a wave rather than that of a current—a local rise or fall in fluid pressure.

Arguing from the anatomical conformation of the canal, I suggest that under the ordinary conditions of normal life the rise or fall in endolymphatic pressure in the ampulla, consequent upon the ordinary changes in position of the head, is quickly relieved by the local excess of fluid passing into the finer position of the canal, and so round to its undilated end, and the pressure being thus rapidly equalised an excessive stimulation of the end-organ is avoided. (The process is similar but reversed, of course, in direction in the case of fall in intra-ampullary pressure.) But when, as in continued rotation, this change in pressure is sustained for a time, or when there is a repercussion, so to speak, the finely calibred canal will be incapable of providing a sufficiently rapid relief and excessive stimulation of the nerve-ending will result, with

nystagmus, vertigo, etc. This theory necessarily refers the period of equilibrium of eye-movements *during* rotation to the exhaustion of the nerve centre. The ampulla may be regarded as a device to favour the reception of small waves, while the rest of the canal provides a method of rapidly equalising the pressure, and so of calming the oscillation.

I turn now to the *pathological* aspect of the question, and first of all to the *spontaneous nystagmus* of the "labyrinth storm." In this particular I have only one remark to make, and that is that I agree that the direction of the spontaneous nystagmus should *not* be taken as the faithful guide to the labyrinth that is affected, or as the means of distinguishing acute labyrinthitis from cerebellar abscess. In acute labyrinthitis I have more than once observed spontaneous nystagmus to the affected side, although, of course, in most cases it is directed to the opposite side. The reliable distinction lies in this, that in acute labyrinthitis the nystagmus declines in severity as time goes on, whereas, in cerebellar abscess, the symptom persists unaltered, or it may even become more marked.

In *Non-Suppurative Disease of the Internal Ear* I have for several years past been accumulating experience with regard to the vestibular reactions. By adopting the method of measuring the duration of rotation nystagmus, as Bárány advises, or the method of measuring the duration of the induction period of the caloric test, in the manner I have suggested, or by both of these methods combined with an observation of the phenomenon in general, we are able to detect the presence of slight or moderate interference with the vestibular reflexes, and can often thereby obtain information of considerable moment bearing upon the diagnosis, and even upon the prognosis of our cases.

The method of measuring the induction period of caloric nystagmus consists in running into the (cleaned) external auditory meatus a gentle stream of water of a temperature of from 22° to 24° C., the time being noted when the water begins to flow and when the nystagmus is first apparent, the slow deviation of the eyes being the first to appear. The patient should be instructed to turn his eyes to the opposite side. Although, naturally, I believe the merits of this method to be considerable, I have no desire to lay special stress upon it, because while it is true that as a rule the length of the induction period varies directly with the activity of the reflex, in a few cases the induction period will be found to be of normal duration (twenty-five to thirty-five seconds), although the excursion of the ocular movements is short and the vertigo trifling or absent. Such cases are, of course, defective, although the induction period is of the normal length.

With regard to the findings. Most of the cases seem plain and straightforward, but anomalous results occur every now and again of such a nature as to defy explanation.

An effort was made to correlate the results of the cochlear tests with those of the vestibular tests. The idea before my mind has been to ascertain, if possible, whether the vestibular tests in cases of perceptive deafness, not due to labyrinth suppuration, are of any reliable value in arriving at a diagnosis of the disease or in forming a prognosis in so far as the hearing is concerned. It often happens that the vestibular tests provide us with information not only of interest but also of practical use.

Out of thirty-six cases, nineteen showed a correspondence between the loss of hearing and the impairment of the vestibular reflex. Sometimes, minor discrepancies occur—the deafer ear may show a livelier vestibular reaction than the better ear does, or on one side, although the

deafness is considerable, the vestibular response may be normal. But, on the whole, the claim that a harmony between the two systems exists, more or less complete, is substantiated. In two cases of simple noise-deafness, where, one would suppose, the lesion must necessarily be limited to the cochlea, the vestibular responses were deficient. It is noteworthy that the same result was recorded in a former publication dealing with an earlier series of cases.¹

Seventeen cases showed cochlear and vestibular impairment not in harmony.

Of five cases of nerve-deafness with normal vestibular reactions no fewer than three were proved to be functional and one was suspected of being functional. One case in this group was that of a young woman with very slight nerve-deafness of short duration and normal vestibular reactions, in which it may be supposed that if it should prove to be organic the cochlear lesion was too recent to have spread to involve the vestibule. Of eight cases of nerve deafness with exaggerated vestibular reactions, four were almost certainly functional, two were doubtfully functional, one was almost certainly organic, and the diagnosis in one was unknown. That is to say, out of thirteen cases of nerve-deafness with normal or exaggerated vestibular responses, seven were certainly and three were probably functional in character; while, in two, the diagnosis was that of organic ear disease (one slight, the other moderate, and both of short duration); one case was not diagnosed.

These figures, as far as they go, tend to support, with some qualification, the observation I have previously made that the presence of normal or exaggerated vestibular responses is a point in favour of regarding such cases as functional. The qualification to be made consists in this, that organic nerve-deafness, if of recent origin, may be combined with normal or excessive vestibular responses.

Finally, in four cases the vestibule was affected more than the cochlea. In two the hearing was quite normal in one ear; in two the loss of hearing was only detected by the tuning-fork test; in one there was severe deafness in one ear and normal hearing in the other. The later history of this case and of another with severe unilateral deafness bears out a surmise that in a case with good hearing where the vestibular responses are seriously impaired, the likelihood is that the hearing also will in time become seriously affected. On the other hand, we may regard as more favourable, cases of nerve-deafness, especially if long continued, where the vestibular reactions are normal or exaggerated, bearing in mind, however, the fact that hysterical or functional deafness, like any other similar manifestation of this disorder, is often persistent.

In conclusion, I think we ought to regard the absence or deficiency of vestibular reactions as of more positive value in any given case than their presence, whether normal or exaggerated.

Mr. JOHN F. O'MALLEY described a classification of nystagmus in a series of tables, contrasting the characters of the various types, and indicating the conditions under which they arise physiologically and pathologically.

Mr. T. B. LAYTON found the tests difficult in their application. He did not think that we have in these tests a short cut to the diagnosis of nervous disease, but he claimed we may get from them evidence in a certain number of cases which, when correlated with that obtainable from other sources, will clinch a diagnosis that otherwise must have remained

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., December, 1909, xxiv, p. 646.

doubtful, or will exclude a gross lesion that otherwise must have been left under discussion. The eighth nerve he looked upon in the same light as is the second. No one would dream of making a diagnosis of or of excluding an intracranial tumour without examining the second nerve. Why should they do so without a complete examination of the eighth nerve. The neurologists either must learn to do these tests themselves or they should send their cases to the otologist for examination and report, in the same way as they now either examine the fundus oculi themselves or ask the ophthalmologist to do so for them.

Mr. G. J. JENKINS desired to express disagreement with the generally accepted theory regarding the association of certain forms of nystagmus with certain canals. It has been held by Bárány and generally accepted, as described in the introductory paper by Mr. Scott, that rotatory nystagmus is associated with the superior semicircular canal and vertical nystagmus with posterior semicircular canal. It appeared to him that the canal which received the maximum stimulation by rotation in lateral flexion of the neck and face turned forward and upward must be the superior canal, if the rotation be made from that side forward. This rotation would produce a vestibulo-ampullary current in the superior canal on the flexed side and an ampullo-vestibular current in the posterior canal of the opposite side. Other canals would be affected, but the resulting vertical nystagmus would probably be due to the preponderating influence of this superior canal and not the posterior canal. Similarly, he held that the posterior semicircular canal and not the superior was the important peripheral stimulus for rotatory nystagmus. He could not agree that sufficient evidence had been brought forward by the caloric test to prove that the various forms of nystagmus could be due to other canals than those described. At least, he held that anatomically the above reasoning was correct.

It is interesting to note that a nystagmoid movement artificially produced may cause vertigo with associated phenomena in certain cases. By rotating a cylinder with a series of spots on it and getting the patient to fix these spots as they come into vision vertigo can be produced. If these be done where there is an irritable labyrinth the nature of the vertigo can sometimes be changed at will of the operator. He has been in the habit for some years of testing for the irritable labyrinth by means of a mirror rapidly moved to produce a nystagmoid movement.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Held in the Western Infirmary, Glasgow, June 6, 1914.

DR. WALKER DOWNIE, *in the Chair.*

Report by DR. W. S. SYME.

(Continued from p. 442.)

Dr. Maurice's Kinesiphone.—Its Mechanism and Mode of Use.—The Author's Claims and Results.—Effects in three cases of Catarrhal Deafness treated with its Aid.—J. Mackenzie Booth.—The

kinesiphone of Dr. Maurice, of Paris, is an ingenious adaptation of the Faradic battery to produce sounds like those of the human voice, which are intensified and transmitted to the ear by telephonic receivers. The sound is produced by the vibration of platinum plates under tension by a rubber point, the increase or diminution of which tension raises or lowers the pitch of the sounds.

Two resistances are furnished to regulate the intensity of the sound—one for either ear. There are three registers for low, middle and high notes, and the inventor claims that these comprise sounds of from 80 to 3500 vibrations per second, roughly corresponding to those of the human voice. The apparatus is worked by a 6-volt accumulator, placed in a recess at the back of the cabinet. It is furnished with an amperemeter to show the amount of current being taken, a voltmeter to test the condition of the accumulator, and an interrupter to cut off the current from the receivers at will. The inventor claims that the sonorous vibration is an advance on the mechanical vibration of Delstanches masseur or of Breitung's pump, and that with partial deafness unimproved by other methods, irrespective of the cause, he obtains 75 per cent. of successes, 20 per cent. partial successes and 5 per cent. failures. By success he means getting ten times the original acuity of hearing. He also claims that the tinnitus and other discomforts accompanying the aural condition are relieved or disappear during the treatment. He recommends that the sound should be raised till the patient experiences a tickling sensation in the affected ear or ears, that the sittings should be from six to ten minutes daily, and be continued for fifty or more times, the hearing power being tested every few days. He divides his cases into sclerosis of the tympanum, mixed tympano-labyrinthine sclerosis, cicatricial sclerosis following otitis media, and purely labyrinth cases, and gets his best results in unilateral deafness and infantile forms and cicatricial cases, with or without loss of ossicles, while the catarrhal and purely labyrinthine forms benefit less by this method.

CASE 1.—J. S.—, aged twenty-six, a marine engineer, has suffered from nasal catarrh for eight or nine years affecting both ears, and has been getting deaf during that time. He has been under treatment from time to time for four years. Tinnitus has been fairly frequent but never distressing. Rinne's test is negative on both sides. There is no paracusis, and in the noises of the engine-room he finds it more difficult to hear voices. Latterly he has found conversation very difficult. From January 23 till February 26, 1914, he had thirty sittings during each of which for from six to ten minutes daily both ears were subjected to the whole range of the sounds available.

Before commencing the hearing distances were :

On right ear, watch 12 in. ; left ear, watch 12 in.

On right ear, whisper 9 in. ; left ear, whisper 7 in.

On right ear, ordinary voice 2 ft. ; left ear, voice 1 ft.

After treatment :

On right ear, watch 22 in. ; left ear, watch 19 in.

On right ear, whisper 3 ft. ; left ear, whisper 2 ft.

On right ear, ordinary voice 7 ft. ; left ear, voice 8 ft.

At this point the patient had to leave for duty, but he was finding conversation much easier and declared that the subjective noises had vanished. In recent letters from South America he states that the hearing has continued to improve. Probably longer treatment would have given a better result.

CASE 2.—A medical man, aged thirty-nine, has been deaf for twenty

years, commencing during his curriculum with nasal catarrh, attributed to excessive diving. He was treated at that time in Aberdeen, and after graduation he was referred to Sir William Dalby. Since then he has been treated by about twenty well-known aural surgeons in England, Scotland, and Ireland, and has undergone almost every known form of treatment. Nasal douches, inflations of air, hot air, medicated vapours, injections of thiosinamin and pilocarpin, Eustachian catheterisation and bougies are a few among the many measures employed. Two years ago he had a submucous resection of the nasal septum done, after which his hearing on the better side was permanently worse. More recently, in London, he has had one of his tympanic membranes blistered, with bad results after a temporary amelioration. Neither the watch nor the whispered voice can be heard, the tuning-fork is badly heard over the vertex and mastoid area, and only a very loud voice can be made audible quite close to the auricle. Low-pitched sounds are better heard on the right, high on the left, side. Only by means of an electrical aid can he hear one person speaking fairly well, and this enables him to hear the piano when he practises. For a number of years his affliction has totally incapacitated him from professional work. He had forty-two sittings with the kinesiophone from January 24 till March 2, when he had to leave. The strongest sounds were requisite to produce a tickling sensation, and though reddening of the membrane resulted after each sitting it very quickly subsided. At the close of treatment only a very slight improvement could be made out on the left ear—no practical amelioration. One could hardly have a worse case for such treatment, and the result was what might have been expected.

CASE 3.—E. M.—, spinster, aged thirty-six, has suffered from repeated nasal catarrh for over twelve years and has been getting deaf during that time. She has been under treatment for the past six years for hypertrophic rhinitis and subsequent right Eustachian and tympanic catarrh. Nasal douches, galvano-cautery, Eustachian catheterisation, applications to the faucial orifice of the Eustachian tube and the occasional use of Breitung's pump have all helped to give temporary relief. Of late she has found conversation difficult, more especially if more than one person is speaking, and she expressed a wish to have, if possible, further treatment. From January 27 till March 8 she had forty sittings.

At the beginning of treatment the hearing distances were for the right ear:

Watch	12 in.
Whispered voice	21 „
Ordinary voice	3 ft.
After:	
Watch	28 in.
Whispered voice	10 ft.
Ordinary voice	21 „

She says the occasional tinnitus and fulness in the right ear have gone, that she can take part in mixed conversation as she has not been able to for years, and that her relatives and neighbours have been impressed by the manifest improvement in her hearing.

The uncertainty of benefiting any given case and the length of the treatment are objections to its adoption, and one would not readily urge it unless he could foresee a fair chance of success. It would be unfair from such scanty data as the above to draw any definite conclusions, but it seems to me that an instrument capable of producing a great range of

sonorous vibrations of varied intensity, roughly corresponding to those of the voice, and transmitting them to the ear, is an improvement on the earlier mechanical forms and likely to be useful as a means of passive re-education in moderate degrees of deafness.

Dr. GRAY said he had visited Zund Burguet in London and had had a humorous interview. There was a large instrument in the room, and he wanted to see the inside of it, but Zund Burguet did not uncover it. He went through various performances. Dr. Gray could see no difference from the ordinary telephone in its effects. The price of the instrument was then £300. Several of his patients had expressed a desire for this treatment, and he (Dr. Gray) did not discourage them. He measured the hearing before they went and when they came back, and found on testing that they were almost exactly the same as they were before. He had never known anybody get any benefit, although some patients *thought* they were better. Lake had recorded one really very remarkable case in early childhood. He (Dr. Gray) could understand that in the case of a child, whose neurones were not fully developed—they do not complete this development until the age of thirty or at middle life—benefit might result from this method of education, but he could not see how one could expect to re-educate older people. Their ears were being educated too much in a city with so many different noises. If he were to take any drastic measures for these cases it would be exactly the opposite; he would spare the nerves every sound possible; if one could plug the ears up one might get a little improvement, because one would be giving the organ a rest.

Dr. KERR LOVE said there was a committee sitting, and had been sitting for twenty years, with the object of giving a prize to anybody who brings forward an instrument which would really help deaf people. One should discourage these instruments altogether unless they are disconnected from commerce. An individual could be re-educated to a better knowledge of sounds, but not, in his opinion, to greater acuity of hearing.

Dr. PORTER said he was one of the people who had gone in for Zund Burguet's instrument; he was using it only in cases in which the question of fee did not enter. He had tried it in about seven or eight cases, not having as yet had time to do more. Out of six cases, in which the treatment was completed, three or four had got an improvement which could not merely, he thought, be put down to suggestion or optimism. Two of his patients were nurses. The amount of hearing is not a thing one can measure like a pound of butter. If the patients themselves and their friends think they are hearing better, and one can get the improvement to last for a reasonable time, one must conclude they are better. One nurse, who, before treatment heard his loud voice at 12 ft.—it was tested by a tape measure to be sure of the distance—could now hear it at 18 or 19 ft., and for ordinary purposes she certainly heard very much better than before. He had not intended to mention these cases until a more definite decision had been come to; he intended at the next meeting of the Society to show some patients, whether they are improved or not, and give the results obtained. The other nurse was, he (Dr. Porter) thought, distinctly better also. She is aged fifty-six years, and had given up all hope of getting better. He had known her for ten years, and her deafness had been increasing. She now says that she hears the birds in the morning, which she had not done for some years.

Dr. KERR LOVE suggested that Dr. Porter should apply the continuous tone series. The human voice may vary considerably, according

to the physical condition of the examiner. The loud voice could not be relied on.

Dr. PORTER replied that he thought the voice could be regulated. His loud whisper was the loudest possible without breaking into phonation. He had treated an old relative, aged seventy-two, but did not expect to do him good, and had not. On testing him afterwards he brought him out within 6 in. of what he had been a fortnight before.

Dr. DARLING spoke to the improvement in the nurse Dr. Porter had referred to. Previously it was necessary to speak to her in a loud voice, now an ordinary conversational voice was sufficient.

Dr. THOMAS BARR said he was, some months ago, invited to see the application of this instrument. He took with him a patient suffering from otosclerosis. The operator first tested the hearing in a most unreliable manner, and again, after the application of the instrument in an equally unsatisfactory way, then remarking to the patient, "You are a little better." Dr. Barr remarked that of course he would not pretend to do any permanent good at one interview, and asked him to lend an instrument to the Glasgow Ear, Nose, and Throat Hospital for an extended trial. This he appeared to cordially agree to, but the instrument had never arrived. Dr. Barr was unfavourably impressed with what he saw.

Dr. J. S. FRASER said they must all acknowledge that the results of previous methods of treatment in cases of chronic middle ear catarrh, otosclerosis, and nerve deafness had been disappointing, and they should welcome any new method which affords a chance of improvement. If, however, they had regard to the pathology of deafness he did not think that auditory re-education was going to do anything. One could not imagine it absorbing adhesions, or deposits of new bone. The only thing one could imagine it might do was to benefit cases where there was some nerve deafness. Personally he would rather agree with Dr. Gray that even in these cases stimulation of the nerve apparatus would not be the line of treatment one would naturally recommend. It was, however, difficult to account for the good results which Dr. Porter had spoken of, and which Dr. Darling and Dr. Gardiner had confirmed. One must allow that improvement in the mental condition of the patient makes a great difference in the general health. If people were encouraged they felt very much better and were really much better. He thought the improvement in the mental condition produced by such an imposing apparatus must influence the mental aspect of the patient. One must remember that improvement in the hearing distance may arise from that without being permanent. What one wanted was to have these cases followed up and have reports six months, twelve months, and even longer after treatment.

Dr. MACKENZIE BOOTH was absolutely certain that Dr. Porter was right in what he said. He was certain there was improvement where hearing is only partially lost, and, where one can use sounds like those of the human voice, that the patient would get to understand the human voice. He could not understand Dr. Gray's contention. If the voice is shut off the hearing becomes worse from disuse. Re-education was perhaps not the right word to use.

Unusually large Cholesteatoma.—N. Maclay.—The specimen was removed during the course of a radical mastoid operation from a patient, aged thirty-nine, whose sole complaint was vertigo. Unilateral deafness and the history of aural discharge in early life drew attention to the ear,

where inspection revealed the absence of the tympanic membrane and what looked like a dry, irregular, epithelialised surface, corresponding to the inner wall of the tympanum. The presence of the fistula symptom led to the diagnosis of semi-circular canal erosion, and subsequent operation proved this to be so. Six months after operation labyrinthine activity, as shown by caloric and rotation tests, was nearly normal and hearing power was improved.

Thyreoglossal Cyst.—**J. L. Howie.**—Man, aged forty-two, presenting smooth oval mass as large as pigeon's egg above thyroid cartilage. He states that there has been a lump in this situation since childhood, but that recently it has increased in size. There is no discharge into the mouth.

Endothelioma of Right Antrum.—**A. Brown Kelly.**—Man, aged forty-five, began to have pains in right side of head and swelling of right cheek in October last. Teeth extracted, antrum opened from alveolus and pus regularly syringed out. In January first examined by exhibitor, who found a firm, fleshy bulging of skin over right antrum, and in this cavity a lobed growth on its anterior wall. A piece was removed and diagnosed endothelioma. Excision of superior maxilla was suggested, but on opening the cavity the surgeon deemed this inadvisable and scraped it out instead. Since the operation radium had been employed on two occasions. There was now a fistula at the side of the ala through which the antrum can be inspected.

Tuberculosis of the Nasal Mucous Membrane.—**A. Brown Kelly.**—Man, aged twenty-six, complained of deafness, but of no nasal symptoms. In October, 1913, granulating tissue in the right nasal fossa was snared, and in March a piece of what looked like a nodular growth was removed from the left middle meatus by exhibitor; on both occasions the hæmorrhage was very profuse. Dr. John Anderson reports that the tissue is tubercular. The chief infiltration is at the posterior edge of the septum, where it largely fills the choanæ. The case is shown on account of the unusual sites occupied by the disease, the severe bleedings on touching the growth and the obscure histological characters.

Dr. ADAM said he had seen a similar case without bleeding. It had been sent as a case of polypus but turned out to be tuberculous. The inferior turbinate had been destroyed by tuberculous disease.

Dr. LOGAN TURNER said that as the histological characters were obscure and the situation unusual for tubercle, might it not be malignant?

Dr. WALKER DOWNIE said he had had a similar case a short time ago which, however, turned out to be a sarcoma. There was a small out-growth, the size of a pea, on the septum, the removal of which was followed by profuse bleeding.

Ozæna cases treated by Vaccine of Perez's Bacillus.—**A. Brown Kelly and J. F. Smith.**—The vaccine in some cases has evidently exercised a specific action on the nasal affection in diminishing or removing the fœtor, liquefying the secretion and lessening or checking the crust formation. As some cases have relapsed the ultimate effect of the vaccine is still doubtful.

Dr. BROWN KELLY said that one of the cases shown was not quite clean, while the other was worse than she had been for a long time. He

was rather glad of that, however, as he did not wish anyone to carry away too good an opinion of the treatment. These cases would not have been shown had the meeting not been taking place; he would have waited longer to get truer information regarding the results. Of all the many methods of treatment he had used and seen used none gave so great promise as this. The vaccine had undoubtedly a specific influence. First, the fœtor passed off, then the patient stated that the nose was running more, and later, in some cases, the crusts disappeared. The same thing held good when the dried secretion was chiefly in the nasopharynx. He could not tell what the ultimate result would be. Dr. Smith had given the injections all winter to a number of his patients.

Dr. LOGAN TURNER asked if a vaccine of Abel's bacillus had been tried. He had shown two cases treated by that vaccine; one remained well for about five months, then the condition recurred, and another course of autogenous vaccine was given. The improvement lasted only a very short time after the administration of the vaccine. Repeated courses are required. It might not be necessary to syringe at all. He thought Dr. Smith should make some control experiments with Abel's bacillus.

Dr. SMITH said he thought the injection of a vaccine of any toxic organism might cause a certain amount of malaise and even nasal catarrh, with consequent softening of crusts. Perez wrote strongly in favour of his bacillus being the cause of ozæna, and Dr. Hofer, of Vienna, has reported entirely in his favour. If a culture of Perez's bacillus were injected into the ear vein of a rabbit the animal died, and on *post-mortem* examination the bacillus could be isolated from the inferior turbinate bone, but not from the heart-blood. Dr. Smith had injected two rabbits with a mixed bouillon culture of an ozæna crust. Both died after some days, and the bacillus of Perez was isolated from their turbinates. The heart-blood was in one case sterile, and in the other contained a few staphylococci. He had never found this bacillus in the nasal cavities of normal rabbits.

Dr. J. S. FRASER had seen Dr. Kofler in Vienna, who was doing the clinical part of the investigation. Drs. Hofer and Kofler were reporting fifty cases at Kiel. Kofler said his results had been excellent, though not absolutely uniformly so. The vast majority of the patients were able to do without syringing; the crusts did not form, and all fœtor disappeared. Dr. Fraser believed that there were two observers in Budapest working on the same line, and they were reporting 150 cases at Kiel at the same time.

Chronic Recurring Aphthæ of the Mouth.—A. Brown Kelly and William Whitelaw.—Woman, aged twenty-seven, has been subject for three years to small, painful ulcers of the mouth, chiefly on the gums and in the gingivo-labial folds. For several months she was treated with arsenic, iron, etc., without decided benefit. Subsequently an autogenous vaccine containing *Staphylococcus albus*, *Endomyces albicans*, and a diplococcus was injected on ten occasions between November and January last, but with little or no improvement. Afterwards three injections of neo-salvarsan were given, and the Wassermann, which was positive, is now negative. Since the use of neo-salvarsan the ulcers have been markedly fewer, smaller, and less painful. It is not suggested that the aphthæ are related to syphilis, but that they may be influenced beneficially by arsenical compounds.

Dr. LOGAN TURNER was interested in the local effect of the salvarsan.

Some of the cases of Vincent's angina are rapidly and markedly improved after its application.

Dr. KELLY said it was specific. Aphthæ were not necessarily connected with syphilis.

Dr. SYME said he had a case in which the appearance was much the same. The patient is free for months, and then there is a recurrence. The first symptom was severe pain in the mouth, then small vesicles form, the crusts come off, and a small pit was left with inflamed edges. The case appeared to him to be more of the nature of herpes. The patient was undoubtedly very rheumatic, and the severe pain coming on before the vesicles form was very suggestive of herpes. In inflammatory conditions about the mouth one was inclined to steer clear of arsenic. He found that glycerine of borax gave the best result.

Dr. BROWN KELLY remarked that the subjects of aphthæ are nearly all chlorotic or anæmic women; the condition persists for years, and is most troublesome to cure. One expected herpes rather to follow the distribution of a nerve, while these aphthæ occur in all parts of the mouth, viz. the cheek, gums, and tongue. Jonathan Hutchinson wrote a good deal about these aphthæ, though probably under another name, and strongly recommended arsenic. He also pointed out that the affection was non-syphilitic, and that it was aggravated by mercury and iodide of potassium. It was the hopelessness of the treatment in previous cases which led him (Dr. Kelly) to try the vaccine. Dr. Whitelaw had carried out the injections.

Case in which a Cholesteatoma performed the Radical Mastoid Operation.—James Adam.—T. G——, aged twenty-seven, had suppuration of left ear from infancy till ten years old, when there was some hæmorrhage and the discharge ceased. In January last he became giddy, staggered, and for a fortnight could not go on the street unaccompanied. He was seen in February, when a huge cholesteatomatous mass was cleared out, a minute granulation picked off the facial ridge, and a small fragment of the lower rim of the membrane removed. Nature has cleared out the whole mastoid, lowered the facial ridge to its limit short of producing paralysis, removed the membrane and ossicles, closed the tube and epithelialised the cavity. Labyrinth symptoms disappeared with the removal of the cholesteatoma: whisper, 10 ft.

Dr. MACKENZIE BOOTH related the history of a case he had seen recently which he had treated twenty-three years before. The patient came to him with facial paralysis and mastoid tenderness and a little pain. The mastoid operation was recommended. Prof. Ogston was called in consultation and on operating Dr. Booth found a tumour, the size of a Tangerine orange. It had done the radical operation; only the bone had to be scraped and the part cleansed. The patient was quite well now with the exception of a slight paresis on the right side. It was a big cholesteatoma which had pressed on the dura mater.

Dr. GRAY said he had a similar case at the Victoria Hospital, where the whole operation had been done and it only took five minutes to complete it. Facial paralysis had come on a few weeks before operation. In such cases the prognosis as regards the facial paralysis depended on the rapidity with which the surface of the wound in the bone healed. In his case this occurred in three or four weeks. Electrical treatment was given month after month, though he did not expect any benefit to result. However, six months afterwards the patient came back quite better, much to his astonishment.

Dr. LITHGOW said he had removed a cholesteatoma about the size of a Tangerine orange from the mastoid of an old man. The middle ear was unaffected.

Dr. LOGAN TURNER had had a case recently where the same radical operation was performed. The facial nerve lay exposed, but there was no facial paralysis until after the operation.

Dr. SYME said he had operated on a case where the facial nerve traversed the cholesteatoma unprotected by bone. The nerve was held up by a hook during the operation. Facial paralysis, however, followed. Electrical treatment was persevered in for some weeks. The operation took place about six months ago and the patient returned home with the facial paralysis unbenefited. Still, in view of Dr. Gray's experience, he would not give up hope.

Orthodontic Case to show the Advantage of Continuous Spring Pressure with Annealed Gold Wire tied to the Teeth, over the older Split Plate actuated by a Screw.—James Adam.—Boy, aged twelve, had tonsil and adenoid operation in September; expansion begun in October and continued six months. Width across last molars has increased from 5.3 cm. to 6.3 cm. Lower jaw has not followed suit, and the process is now being applied to it. Respiration much improved. Casts shown.

Case of Malignant Disease involving Hypopharynx and Ostium of Gullet—Apparent Cure under Radium.—James Adam.—Miss W——, aged forty-six, says she began to feel slight irritation in throat eight years ago: consulted various doctors and was told her throat was granular and rheumatic. From August, 1910, to December, 1912, was treated with bougies for stricture of gullet. During this period symptoms became worse; pain on swallowing and speaking, with continuous discharge of mucus, especially during the night, so that she had sometimes to sit up in bed the whole night. For months the sole diet was milk and bread soaked in milk, and that caused great pain. Weight fell to 105 lb. When first seen by exhibitor in January, 1913, she was very anæmic and looked starved. Small polypoid buds were seen in right sinus pyriformis, and later the growth could be seen extending down the mucous membrane behind cricoid to ostium. A doubtful gland on right of neck. Part of the hypopharyngeal growth was removed, and Dr. John Anderson, Pathologist to Victoria Infirmary, reported: "Proliferation of external epithelium, with indippings of broad epitheliomatous processes and out-planting of areas of epithelium in deeper tissues. The fibrous stroma shows presence of inflammatory cells and young connective-tissue. The case is definitely malignant."

She was taken to a general surgeon, who declined to operate. In December Dr. Logan Turner saw patient; agreed with diagnosis and recommended operation. This she declined, and was referred for radium treatment. After five *séances* of one hour and one of two hours during one month the growth had almost disappeared (50 mgrms. in first two exposures, 100 mgrms. in the others, and so screened that all the gamma rays and 25 per cent. beta rays passed, the chief effect being from beta rays). March 27: radium, 100 mgrms. for two hours. March 30: 100 mgrms. for an hour and a half. All that could then be seen was a small tag of granulation tissue just within the ostium, $\frac{1}{8}$ in. wide, $\frac{1}{4}$ in. long. This was destroyed by cautery. No trace of growth is now to be seen; symptoms have disappeared; patient can swallow solids with

comfort for the first time in five years; and, although there is some contraction of stomach from years of semi-starvation, she has put on 10 lbs. weight and is regaining colour.

Dr. LOGAN TURNER said Dr. Adam had kindly asked him to see this case. Nobody would have doubted clinically that it was malignant; there was no doubt about it also in Dr. Anderson's report. He (Dr. Logan Turner) had taken away a piece. The pathologist who examined it was not at all decided about the malignancy. This might be due, however, to his not having removed a piece of the tumour margin. There undoubtedly was now no trace of any growth. Another patient under Dr. Logan Turner's care, treated with radium, though at first improved had gone from bad to worse. He had had a letter from her doctor recently saying she was too ill to come over for inspection. That was a case of squamous epithelioma. The interesting point in the present case was that the patient had not had a great deal of radium; she was cured with comparatively little, whereas his patient had had radium over a long period. A large mass of the tumour had disappeared, but she was obviously dying on account of what was left.

Dr. BROWN KELLY said that there might be a very long period of discomfort in the upper part of the gullet prior to the appearance of cancer. In this connection he referred to the case of a woman who consulted him three years ago for slight irritation in the throat, but in whom the result of examination was negative. She returned two and a half years later with abductor paralysis of the left cord. Esophagoscopy revealed cancer at the upper end of the gullet. A more striking case was that of a woman who came to him with epithelioma in the hypopharynx, from which she died shortly afterwards. She told him that she had attended a hospital with fair regularity for sixteen years, and had had bougies often passed. In regard to the case under discussion, it was reported that polypoid buds were present in the pyriform sinus in January, 1913, and that she was seen by Dr. Logan Turner in the following December. The course of the disease seemed to him to be unusually protracted; he would have expected the patient to have been dead long before that. He had seen the result; it appeared to be perfect; in fact it was so good that he was inclined to doubt the diagnosis of malignant disease.

Dr. WALKER DOWNIE agreed with much that Dr. Kelly said regarding the duration. One case he had hoped to show was that of a woman with difficulty in swallowing, which had lasted six or eight months. It was a case of post-cricoid cancer. The whole of the larynx and upper part of the gullet has been excised. It was an extensive epithelioma. For some years before she came under observation she had had difficulty in swallowing, but no active ulceration had been detected until within one week of the date of operation.

Dr. ADAM, in reply, said he did not think that at first it could have been malignant, but everybody who saw it thought it was, and Dr. Anderson's report was quite definite. He (Dr. Adam) had not seen the section. It certainly had been a very mild type of malignancy. They knew, of course, that there were types and degrees of malignancy, and that radium did better in the types approaching those of skin lesions. He had another case of epithelioma of the trachea just above the right bronchus; it also is being treated by radium, but the patient is distinctly worse. It was quite obvious that the treatment does well in some cases but not in others.

Abstracts.

PHARYNX.

Henke, F. (Konigsberg).—New Experimental Observations on the Function of the Tonsils. "Archiv. für Laryngol.," vol. xxviii, Part 2.

In the course of a brief discussion of the numerous suggestions which have been put forward as to the function of the tonsils, the author states his belief that there has been great exaggeration during recent years on the part of some writers, in regard to the frequency with which the tonsils form the portal of entry for many general diseases for whose onset they have been held responsible. The great differences in the statistics of various writers—from 80 per cent. (Faerber), to 1.4 per cent. (Pibram) in the case of articular rheumatism—suggest that much doubt still exists on the matter, and it is still a question whether the acute tonsillitis sometimes observed in association with various diseases is not in reality a secondary localisation of an infection which has gained an entrance by some other channel. In order to test the capacity of the tonsils for the absorption of particles from the food, a series of rabbits were fed for a week on food containing large quantities of soot and chinese ink. Subsequent microscopic examination never showed any trace of absorption of these substances by the tonsils, although they were freely taken up by the intestines. The results of Lexer, who fed rabbits on virulent streptococci, and after the death of the animals found the organisms present in the tonsil-tissue, do not justify the conclusion which he draws, that the tonsils were the only, or even the chief portal of entry of the infective organisms. The latter were present also in other portions of the pharyngeal mucous membrane, and were in fact more numerous in the periphery of the tonsil, that is, in its capsule, and in the surrounding muscular and glandular tissue, than in the tonsil itself.

Somewhat in opposition to the view that even the normal tonsil is to be regarded as a weak spot through which infection commonly enters, is the suggestion that it serves as a defensive mechanism, in virtue of the phagocytic action of the leucocytes which migrate actively to its surface. Brieger, however, showed that the cells which pass out of the tonsil-tissue are in reality lymphocytes, and was forced to postulate a lymph stream which carried these cells passively to the surface. As, however, Levenstein remarks, proof of such a lymph stream has been hitherto wanting.

A very different view is that of Schönemann who regards the tonsils as submucous lymph glands, and acute tonsillitis as due to infection reaching the tonsil from the area which it drains. Clinical experience lends much support to this idea, and its correctness has been established as a result of experimental injection of the nasal mucous membrane carried out by Schönemann in man, with iodine solution, and by Lenart and the author in animals and man respectively, with solid particles in suspension. It may therefore be regarded as certain that in man there exists a direct lymphatic communication between the nose and the tonsils. A similar lymphatic communication was proved by the author to exist between the mucous membrane covering the alveolus of the upper jaw and the tonsil, an observation which he claims to be "new." As a result of numerous carefully conducted experiments he was further able to satisfy himself that there exists a constant lymph current passing from the lining membrane both of the nose and of the gums towards the tonsils, and through it on to

its free surface. Such a current must act as a powerful defensive mechanism against the entrance of micro-organisms, and the proof of its existence must dispose of the view that the tonsil is not only a useless organ, but a *locus minoris resistentiæ*.

The function of the tonsils is therefore comparable to that of the ordinary lymphatic glands. They serve for the production of white blood corpuscles, and act as a filter for the lymph which passes through them. Foreign bodies, bacteria, etc., may be arrested in the tonsils as in the lymph glands, and there rendered innocuous. As, however, the tonsils differ from the lymph glands in having a large surface (much augmented by the presence of crypts) freely exposed in the pharynx, they offer an exceptional opportunity to the organism of freeing itself from foreign substances which have gained entrance to the lymph stream.

It follows that tonsillitis, occurring either alone or in association with some other disease such as rheumatism or endocarditis, is seldom due to infective material gaining entry through the surface of the tonsil, but the result of a secondary infection conveyed by the lymph stream, the portal of entry being in most cases somewhere in the nose, the accessory sinuses, or the mucous membrane of the mouth.

This view is in no way incompatible with the well-established fact that severe general infections do take their origin from diseases of the tonsil. In this connection it is necessary to distinguish carefully between healthy and diseased tonsils. When, as a result of marked pathological changes, the tonsil has come to resemble, as Hopmann says, a "choked filter," it is obvious that it should be regarded as a constant source of danger to the body as a whole.

Thomas Guthrie.

NOSE.

Joseph, Jacques (Berlin).—A Contribution to the Total Rhineoplastic Operation. "Münch. Med. Wochenschrift," Nr. 13. 61 Jahrgang.

The term rhineoplastic has been initiated by the author to denote those nasal plastic operations which involve an addition to the existing nasal structure. Such operations he divides into partial and total. A total rhineoplastic operation is defined as one in which not alone the external skin is totally or almost totally reproduced, but in which the supporting structures of the nose are also reproduced. He further lays it down as necessary that in these cases the transplanted parts should be surgically so remodelled as to resemble the natural nose in shape and size.

The Indian is adopted in preference to the Italian or frontal method of obtaining the skin flap. The authors technique is as follows: The incision on the right arm resembles an angular nine—looked at with the arm raised—the open part of the curve looking downwards and outwards so that the blood supply of the flap corresponds to the course of the vessels. The incision is carried down to the perimyrium which is carefully preserved. The bandage is so applied that it only encircles the head, arm and hand; after a couple of days when it has dried the forearm and hand are cut free. The one essential is that the upper arm and head should be kept so closely in approximation that the nutritional bridge may not be exposed to tension. The bandage is composed of cotton-wool, an ordinary bandage, and starch bandages, in which way it is kept as light as possible.

The author has had a special porous head receptacle constructed so as to insure the speedy drying of the bandage. The patients are allowed up a couple of days after the operation. According to its size it is necessary to wait for from two to three weeks, until the facial vitality of the flap is insured, before dividing its base. In a couple of the author's sixteen successful cases the fresh scar-tissue began to suppurate about a week after the stitches were removed. This was, however, quickly arrested by the application of 10 per cent. solution of silver nitrate. The difference in the colour of the skin soon disappears and may be helped to do so by exposure to sunlight or the ultra violet rays.

The osteoplastic part of the operation is performed as follows: Two pieces of bone—prismatic on cross-sections—are resected from the anterior crest of the tibia. The largest, which is 5 cm. long, 1 cm. broad, and 8 mm. thick, is implanted directly in the middle line, beneath the brachial skin already united to the face—that end which is to lie under the tip of the nose having been previously rounded off with a file. It is further advisable that this end should be embedded in fat and be some mm. removed from the superficial skin-surface. The smaller of the bone splinters, which is about 3 cm. long, 4 mm. broad, and 3 mm. thick, is embedded in the first instance in the skin of the upper lip, in such a way that one of its ends comes to lie where the base of the septum is found under normal circumstances. After one or two months this piece of bone together with the overlying skin of the upper lip, is cut out in such a manner that it maintains a medial nutritional bridge. It is then twisted so as lie in the direction of the normal septum, and its free end sewn to the point of the freshened nasal stump (tibio-labial septum formation).

The third step of the operation consists in the remodelling of the newly-formed nose. Of special importance is the formation of the upper alar grooves, the diminution in width of the nasal stump and the formation of nasal apertures. The two former are carried out in one act as follows: A deep incision is made downwards and forwards at the side of the nose with its concavity directed downwards. A tongue-shaped portion of the subcutaneous fat is then excised from beneath the upper and lower edges of this wound, that taken from beneath the upper edge being considerably larger and extending higher than in the case of the lower. Through these wounds fat or a small piece of bone may be introduced beneath the point of the nose for the purpose of intensifying the latter should this be necessary. The nasal apertures are formed by the raising of a small triangular skin flap. This flap is taken from the neighbourhood of the point of the nose in such a way that its base is directed towards the septum and that the upper of the two cuts corresponds to the projected edge of the nasal wing. By subsequent undermining and division two flaps are formed which are readjusted and sewn into position so as to ensure a permanent aperture lined with skin.

These various operations are usually performed under local anæsthesia. The author's results and the convincing photogravures which accompany his article make one marvel both at his ingenuity and at the success which has attended his efforts.

J. B. Horgan.

EAR.

Rae, John B.—Case of Gunshot Wound of the Ear. "Annals of Otol., Rhinol., and Laryngol.," vol. xxi, p. 359.

Italian, aged thirty-one, "fooling with a 22-calibre gun," shot himself accidentally in the right ear. Became unconscious in half-an-hour.

Bullet removed. Discharged in two weeks. Six weeks later, temperature 100°, marked facial paralysis, copious discharge, acute urgently operative mastoiditis. No vestibular symptoms. Hearing. Loud voice close to, bone-conduction increased, Weber R positive. Radical operation. Mastoid cellular and completely involved. Part of bullet found in middle ear. No ossicles found; promontory intact. The bullet was jammed under the overhang of the posterior wall, extending from neighbourhood of oval window to floor. Recovery delayed by cellulitis. Functional tests just before complete healing gave reactions as before with improvement for voice. Caloric test positive. Facial paralysis not improved.
Macleod Yearsley.

Braislin, W. C.—The Relief of Tinnitus by the Use of Nitrate of Silver applied within the Eustachian Tube. "Annals of Otology, etc.," xxi, p. 773.

Tinnitus due to inflammatory conditions of the tube yield more readily and more permanently to 5 per cent. solutions of nitrate of silver introduced *via* the catheter on wool-carrying probes.

Macleod Yearsley.

Boyd, W., and Hopwood, J. S.—A Case having a Bearing on the Localisation of the Auditory Centre. "Lancet," June 14, 1913, p. 1661.

A man, aged forty-seven, with chronic mania, an inmate of the Lancashire County Asylum. Marked arterio-sclerosis. Hearing apparently perfect, but marked auditory hallucinations. *Post-mortem*, the greater part of the left temporal lobe was replaced by a large cyst. The destruction involved the whole of the temporal lobe with exception of the third and the anterior extremities of the second and first convolutions, the last named bearing the anterior gyrus of Heschl on its upper surface. Rest of brain normal.

Macleod Yearsley.

MISCELLANEOUS.

Kahn, L. M. (New York).—Congenital Bilateral Fistulæ of the Lower Lip. "Amer. Jour. Med. Sci.," August, 1913.

The author could find records of only twenty-two cases of this condition, and he adds one to their number. The patient was a boy, aged three. There was no family history of any facial or other congenital deformity. The fistulæ, whose openings were in the usual situation on either side of the mid-line of the lip, were each about 1.5 cm. in length. The opening in each case just admitted a fine probe, and the tract ran downward and inward toward the median line, and ended in a blind pocket immediately under the mucous membrane of the inner surface of the lip.

Congenital fistulæ of the lower lip tend to occur in several members of the same family and to be accompanied by other deformities. The author refers to a number of the recorded cases, and to the attempts—none of them wholly satisfactory—which have been made to explain this developmental anomaly.

Thomas Guthrie.

REVIEWS.

Anæsthetics. By DUDLEY W. BUXTON, M.D., B.S. Fifth edition. London: H. K. Lewis, 136, Gower Street, W.C. Price 10s. 6d. net.

When a work by an eminent authority has reached this stage, limited space may be better used by suggesting possible improvements than dilating upon obvious excellencies.

Whilst agreeing that scientific knowledge is essential to the anæsthetist, we think too much stress is laid upon the results of laboratory experiments, which—even when indisputable—are not always safe guides under altered conditions. Certain important subjects, such as shock and after-vomiting, are dealt with in scattered paragraphs—a plan inconvenient for reference, and entailing repetition, whilst leaving us without stated principles.

In regard to operations of special interest to the readers of this journal—the importance of co-operation between surgeon and anæsthetist might be more emphasised, and fuller advice given by which it may be attained. For examples: Hahn's tube and Doyen's gag are merely mentioned without description—nothing is said as to the particular duties of an anæsthetist during a mastoid operation, the advantages and disadvantages of post-nasal plugs, etc., etc. Otherwise these sections are very good, and we are glad that attention is drawn to the risks of deep chloroformisation during tonsillectomy.

Most of the accounts of new methods are satisfactory, but little is said about the untoward effects which may occur, both during and after operation, from the bulk of fluid required for intravenous anæsthesia.

Local and conduction analgesia seem (except as regards their relations with general anæsthesia) more suitably discussed in works on general and special surgery; the accounts, especially of the latter, are far from complete.

It need hardly be added that the printing and illustrations are thoroughly well done.

J. D. Mortimer.

Compendium of the Pharmacopœias and Formularies. By C. J. S. THOMPSON. Fourth Edition. London: John Bale, Son & Daniellson, Ltd.

The fourth edition of this useful little book is welcome, and has been brought well up to date. It shows at a glance official and unofficial pharmacopœias, and contains numerous practical aids to prescribing and dispensing, including a complete list of incompatibles. It is one of those handy little volumes that form such useful adjuncts to the consulting-room table.

Macleod Yearsley.

NOTES AND QUERIES.

Dr. H. S. Birkett, of Montreal, Canada, has been elected Dean of the Medical Faculty of McGill University, Montreal.

Owing to the shortages caused by the war, it has been found necessary to reduce the size of the JOURNAL OF LARYNGOL., RHINOL., AND OTOL., for the time being.



FIG. 1.—Cancer of larynx, before treatment.

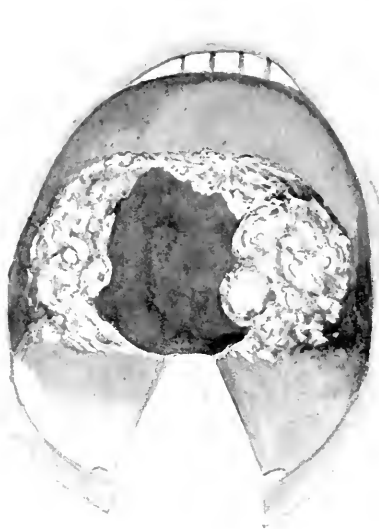


FIG. 2.—Cancer of palate, before treatment.

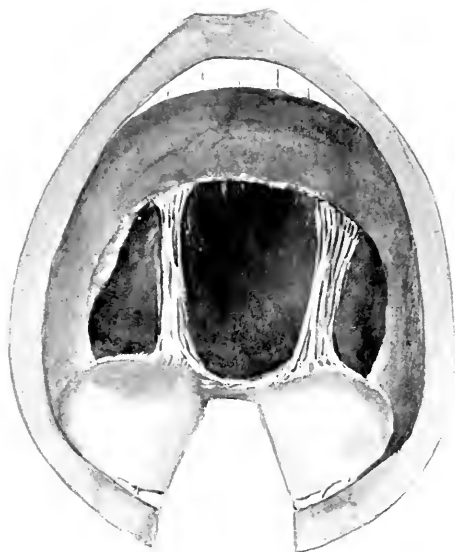


FIG. 3.—After treatment.

TO ILLUSTRATE MR. W. D. HARMER'S PAPER ON DIATHERMY IN THE TREATMENT OF INOPERABLE GROWTHS OF THE NOSE AND THROAT.

Adlard & Son, Impr.

THE
JOURNAL OF LARYNGOLOGY.
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

**DIATHERMY IN THE TREATMENT OF INOPERABLE
GROWTHS OF THE NOSE AND THROAT.¹**

BY W. D. HARMER, M.C.CANTAB., F.R.C.S.

THE treatment of inoperable growths of the nose and throat by "diathermy" has not received as much attention as it deserves; but I hope that the following account of my experiences may stimulate wider interest in this method. It should be pointed out here that the title of our discussion makes it impossible for me to include many other diseases of the nose and throat, namely, rodent ulcer, early malignant disease, innocent neoplasms such as fibromata, angiomas, and papillomas, acne rosacea, hypertrophy of turbinates and tonsils and lupus, which I have treated, or the numerous other uses of diathermy for both medical and surgical diseases; but it seems right to mention them to emphasize the importance of the subject. Those who desire to investigate the matter fully, should consult the excellent book published by Dr. Franz Nagelschmidt of Berlin, in 1913,² or the paper which he read at the Royal Society of Medicine, in 1910 (Electro-therapeutical Section).

The apparatus is made by Siemens. Bros., and costs £42 10s., or £70 for alternating or constant current respectively. Schall's instrument, which costs £25, is also said to be suitable for surgical

¹ British Medical Association Meeting at Aberdeen, July, 1914. Discussion on "The Treatment of Inoperable Growths of the Nose and Throat."

² F. Nagelschmidt, *Lehrbuch der Diathermie*.

diathermy, and has the advantage of being adaptable to any voltage. Each produces a high frequency current of great power, and has two electrodes; the larger, which is wrapped in wet towels and laid on the patient's chest; and the smaller one, which is applied to the growth. The passage of such a current through the small electrode produces intense heat, which rapidly destroys the tissues. On the other hand, very little heat is produced in the region of the larger electrode, because of its greater size, and because it is kept cool with wet cloths.

As regards the technique (see Nagelschmidt, p. 317), the following points are important:

(1) It is essential to have the assistance of a physician who understands, and is responsible for the current.

(2) To avoid shocks the surgeon must wear rubber gloves.

(3) To avoid sparking, the electrode must be buried in the growth before the current is turned on; *per contra*, it must not be removed until the current is disconnected.

(4) To secure rapid destruction the current must be of the proper strength.

(5) The strictest aseptic precautions are necessary.

The operation is carried out in the following manner: For large growths a general anæsthetic is required. As it is important that the part to be attacked should be quite dry, the patient should be given a preliminary dose of atropine; during the operation frequent sponging is also necessary. The best electrode for large tumours is a rake or brush, with five to ten points, half-an-inch in length, which is buried deeply in the tumour. When the current is turned on the neighbouring tissues are rapidly blanched by the cantery—in five to ten seconds according to the vascularity of the growth. A series of punctures should be made, so that, if possible, every part of the growth is attacked. In my earlier cases I was a little nervous of burning too large an area; but now I remove with spoon or forceps the tissues which have been cauterized, and then repeat the burning, so that the deeper parts of the growth are attacked, leaving only tissues which are soft and freely movable; even a tongue which is bound down by a cancer of the tonsil may be completely freed by this treatment. The jaws can then be opened easily, and speech and swallowing are thereby improved.

During the operation the main considerations are: Firstly, to be prepared for tracheotomy, for, with very large growths, there may be difficulty in breathing under the anæsthetic, or later during convalescence; secondly, to avoid burning the tumour too

rapidly, because the heat produced may give rise to dangerous swelling of the neck; thirdly, not to tear away the sloughs too boldly, for fear of troublesome hæmorrhage. Even with the most vascular tumours bleeding does not result from the burning.

Before mentioning my own cases I ought to say that the first experience which I had of diathermy was when Dr. Nagelschmidt came to St. Bartholomew's Hospital, at the invitation of Dr. Lewis Jones, in 1910. Three cases were treated by him on that occasion: A young girl with a vascular nævus of the tongue, which had not been relieved by other forms of electrical treatment; a man with a large endothelioma of the upper surface of the soft palate; and, lastly, a boy with simple enlargement of the tonsils. The ease with which these three operations were performed, and the excellence of the results, at once convinced Dr. Jones and myself of the importance of diathermy. Of twenty-one patients suffering from inoperable growths whom I have since treated, the majority were suffering from cancers of the tonsil, tongue, palate or pharynx. One had an extensive carcinoma of the larynx, and four inoperable nævi of the tongue or nose. My colleague, Mr. Rose, has also treated successfully a case of naso-pharyngeal fibroma. The pain caused by the burning in these cases was not severe, even after extensive destruction of tissue, and in most instances the patients could swallow easily after a period of forty-eight hours. For some reason the surrounding parts became little inflamed, and there was rarely œdema, such as may occur after milder forms of burning. In only two cases was there noticeable swelling of the neck, possibly because the parts were allowed to become too hot. The charts of all the cases have been examined, and have shown that the temperature was rarely raised above 99° F., which need not be considered. Of four with high fever, two died of septic pneumonia (in one tracheotomy had been performed), and two had marked œdema of the face or neck. It would appear, therefore, that sepsis, though always to be feared, is not nearly so common with diathermy as after cutting operations for similar growths. No shock was produced by this treatment, and the patients were rarely confined to their beds for more than forty-eight hours. Although their operations were extensive they were well enough to leave the hospital on an average in six days. As far as possible the necrosed tissues were removed at the time of the operation, and the resulting sloughs separated in five to ten days, leaving a healthy wound, covered with normal mucosa, without any tendency to scars. Such a result has been noted in one case, even though the deeper parts

of the growth could not be destroyed. As a consequence there has been a cessation of septic discharge and of salivation; hæmorrhage and dysphagia have also been greatly relieved.

The unfavourable cases were those in which the growth had invaded the neck or when bone was diseased; in the latter diathermy caused periostitis, the ulceration persisted and pain was thereby increased. In only one case was there secondary hæmor-



FIG. 4.—Nævus of face. Before treatment.

rhage, which occurred on the sixth day after an attempt to dislodge a slough, and this was not of serious account. No other complications have been noted, excepting burning in the region of the large electrode in two cases. In most instances more than one treatment was found to be necessary.

Nearly all the patients suffering from cancers were enormously improved by the treatment. The most lasting result was obtained in an old man with carcinoma of the tonsil and tongue. This patient had five applications of the cautery and lived for two

years with little discomfort until the last three months of his life. After his first treatment there was no recurrence for twelve months and the cervical glands did not become enlarged until nine months later.

A patient sent to me by Dr. William Hill and Mr. Cecil Graham was a good example of the benefit which may be obtained. The growth was an epithelioma involving the tonsils, palate and pharynx and almost filled the back



FIG. 5.—After treatment.

of his mouth, so that speech and swallowing were difficult. At the first operation a piece of growth as large as a Tangerine orange had to be removed with a snare to enable him to take the anæsthetic. The remainder was then burnt away with the result which is shown in the diagram. After the second operation no growth could be seen in the throat and he swallowed normally. The glands were then removed from his neck.

A man who had carcinoma of the pharynx and larynx, was able to breathe and swallow so much better ten days after the operation that he was allowed to return to his home, where he died three weeks later of septic pneumonia.

In a case of carcinoma of the cheek the improvement was so marked that the growth was afterwards removed with a knife by a surgeon in the country, but I have failed to trace the result.

In three others the result was equally good and the glands were removed from the neck. In five cases radium was also employed to check the recurrence.

Turning to the duration of life it has been found that three patients were alive and well two to nine months after their first treatment. Of the remaining fourteen, one lived two years, one fifteen months, one ten months, two eight months, three five and one four months; two died within four weeks and three could not be traced. When considering these results it must be remembered that all the cases had very advanced disease, and that although life may not have been prolonged greatly, most of them received material benefit from the treatment.

To conclude, I consider that diathermy is most valuable for the destruction of massive ulcers in the nose or throat, especially when associated with dyspnoea, with urgent dysphagia, blood-spitting or constant expectoration. The obvious advantages over the knife are the rapidity and ease of the operation, the possibility of removing even a dangerous growth without loss of blood, the fact that the vessels and lymphatics are sealed by burning, and the quick recovery. There is no difficulty in destroying the superficial parts of such a disease and the patient is more comfortable afterwards. For the man who knows that he is dying of cancer such relief, although temporary, gives fresh hope, so that the last days of his life are less miserable than when nothing can be done. Although there is no evidence that the cancer cells are easier to kill than normal tissues, my impression is that the rapidity of the growth is sometimes checked and that the enlargement of the glands in the neck is often slow. By eliminating the septic element from the case we may possibly prevent the rapid dissemination of the cancer cells. Be that as it may, in some cases where growth remained it became atrophic in character for a time. Moreover, there may be less tendency to recurrence than after a cutting operation. For simple vascular tumours, such as naevi, the results are all that could be desired.

Diathermy, therefore, is a method of dealing with growths which is worth the consideration of every surgeon in charge of a department for diseases of the nose and throat. The results of treatment of cancer in the mouth have been so encouraging that we must now see whether it cannot be employed for the improve-

ment of extrinsic carcinoma of the larynx, or for some forms of tuberculous laryngitis. It also remains to be seen whether it will be a safe treatment for inoperable strictures of the œsophagus.

THE TREATMENT OF INOPERABLE GROWTHS OF THE NOSE AND THROAT BY RADIIUM.¹

BY WM. HILL, M.D.,

Surgeon for Diseases of the Throat, Nose, and Ear, St. Mary's Hospital;
President of the Section of Laryngology, Royal Society of Medicine.

SPEAKING generally radium irradiation is worth trying in any malignant growth in our area, which is considered hopelessly outside the range of radical excision by the knife, provided always that an adequate amount is available and that the primary growth is accessible and not too far advanced and extensive, that the secondary adjacent growths and more remote metastases are not a contra-indication, and provided also that the general health of the patient is fairly good. As regards the latter it must be remembered that when an extensive growth is irradiated and reacts well that a massive dose of toxins, due to the products of absorption of the tumour entering the circulation, may cause not merely general malaise and fever but a very definite toxæmia, associated in some cases with dangerous thrombosis in areas remote from the tumour. In a recent case of a round-celled sarcoma of the base of the tongue, lingual tonsil area, under Dr. Pegler, the insertion by Mr. Totter of Dr. Finzi's 100 mgrm. radium tube through the skin from below into the tumour caused not merely the disappearance of the whole growth within the course of a day or two, but unfortunately led to the appearance of œdema of one leg due to thrombosis of the internal iliac. The patient, however, made a good recovery. I have observed bad toxæmia in three of my own patients, one with a sarcoma of the antrum and in two cases of carcinoma of the œsophagus.

In pharyngo-laryngeal cancers of large size, marked glandular involvement is, of course, a contra-indication, and no one ought to worry a patient with radium in gullet cancer if a tracheo-bronchoscopic examination, which should never be omitted in such cases, shows that the growth has invaded the air-passages.

¹ British Medical Association Meeting at Aberdeen, July, 1914. Discussion on "The Treatment of Inoperable Growths of the Nose and Throat."

It may be stated, again speaking generally, that round-celled sarcomas, especially lympho-sarcomas and lymphadenomas, react rapidly and consistently well to radium as do also most endotheliomas. Spindle-celled sarcomas and fibro-sarcomas usually react fairly, whereas squamous epitheliomas and also carcinomas of the glandular variety are far more uncertain in the way they react to radium rays. It may be asserted, however, that some epitheliomas in the nose, throat, and gullet do react beneficially to radium, in striking contrast to those of the tongue and of the vulva. The reason why the action of radium on cancerous growths is so uncertain compared with the behaviour of sarcomas and endotheliomas is not clear. The uncertainty is not, however, confined to carcinomata, though more common in that group, for during the same month I had under my care four or five years ago two men, each of whom had a large, hard growth on the left side extending from the zygoma to the clavicle; portions removed for diagnosis showed each to be identical in structure—endothelioma—yet though they were irradiated with equal weight and time doses in the one case the growth disappeared, though he died nearly two years later from growths in the lung, while in the other case the steady growth of the tumour continued and he died from invasion of the chest six weeks later. I have no reason to think that in this case the treatment actually accelerated the growth; though in a man with an epithelioma of the vestibule of the nose treatment by radium seemed at once to light up the tumour, but as it was fortunately accessible to operation it was removed two weeks later by my colleague, Mr. Graham. In this case radium was first tried on the chance of its reducing the growth so that a small operation could subsequently be carried out to avoid the deformity inevitable after a larger operation.

It is often stated that in no case should radium therapy be employed if the growth is capable of being radically removed by the knife, or unless the patient refuses operation. But many good observers consider that operable accessible sarcoma of the jaw and naso-pharynx quite properly may be, and even should be, in the first instance given the chance of the effect of radium, and even if an operation is subsequently decided on in a case reacting well, to make sure of cure, a less extensive dissection would be required. Sarcomas of the tonsil, again, react so well to radium, often disappearing almost in a night, as the saying is, that operation, if not actually unjustifiable, is at all events the least preferable procedure *in the first instance*. For operable epitheliomas and gland

cancers in the throat the converse is the case, and failing operation surgical diathermy should be first considered, though radium may be employed as an adjunct.

Success in radium therapy in the region under discussion depends not less on technique than on selection. An adequate supply of the salt or of the equivalent in emanation is a *sine qua non*. Finzi lays down that at least an equivalent of 50 mgrm. of radium bromide, *i.e.* about 26 mgrm. in terms of the metal should be employed. It must be stated, however, that at least one radio-therapist, who for long worked with the equivalent of only about 8 mgrm. of the metal, claimed gratifying results. I saw some years ago a case of epithelioma of the palate treated by Dr. Knox with 26 mgrm. of radium bromide in which the growth disappeared and the patient was free from recurrence quite recently. With smaller weight doses the time dose is necessarily increased and this latter is a matter of moment in the cavities of the throat and gullet and to some extent in the nose where it is inconvenient and even dangerous to unduly prolong the time of application. With from 100 to 200 mgrm., suitably screened, the time of application is proportionately decreased to the great advantage of the patient. As nearly all my patients have been treated in conjunction with Dr. Finzi, who has in recent years had the equivalent of 200 mgrm. of radium bromide available, I can only vouch for the results obtained with the aid of such doses and am unable to speak from any experience of small doses.

It has been said that the deleterious effects occasionally observed in patients where a radium apparatus had been embedded was due to the salt having been employed instead of emanation, suggesting that the action of a tube of radium salt was different and more deleterious than an emanation tube of equivalent gamma radio-activity with identical screen and time doses, on account of a supposed excess of alpha and beta rays in the former. There is not the smallest warrant for such an assumption—the only difference in the behaviour between two such tubes of identical initial valency being due to the fact that the action of the salt is practically constant, whereas the radio-activity of the emanation tube is always decreasing, amounting to a loss of 16 per cent. during the first twenty-four hours.

There is an advantage in using emanation tubes in certain circumstances as metal boxes can be constructed to suit special cases and special areas as regards shape and size, *e.g.* a flat circular box for the tonsil, an oblong or cordate-shaped box for the

post-cricoidal pharynx, or a very long tube for the gullet. I have no difficulty, however, in using the ordinary radium tubes as they can be linked up together either two or three abreast or even unicorn fashion in the pharynx or arranged tandem in the gullet.

As regards screening, though formerly silver or lead was used in my practice, for the last four years only platinum screens have for the most part been employed, varying in thickness from 1 to 1.5 and 2 mm. and covered by rubber 1 mm. thick to avoid secondary radiation from the metal. Silver, a less effective screen, is, however, largely used at the Radium Institute with very evident success, though 2 mm. thickness of platinum is the equivalent of 5 mm. of silver. It is possible that 2 mm. of platinum may be an unduly thick screen for use in the gullet. On the other hand the fact that others who have treated the gullet have been disappointed with radium in œsophageal cancer may be explained by the fact that the better results may be due to more efficient screening and better technique generally. The question of using quite thin metallic screens for emanation tubes of small calibre has recently come prominently under discussion. Mr. Pinch has employed at the Radium Institute a short needle-like apparatus of narrow calibre with a sharp point at one end and an eye at the other for inserting into small epitheliomas of the tongue which, as is well known, often respond badly to surface applications. Needle-like applicators, somewhat similar in principle, have also been used by Drs. Stevenson and Jolly of Dublin. They, however, enclose their capillary glass tube containing emanation in a hollow steel serum syringe-needle. It is rightly claimed that this type of needle screen more easily penetrates into the substance of tumours and that several such needle-screen tubes can be inserted at once into the growth. The disadvantage of such an apparatus compared with the iridium-pointed needle of Pinch is to be found in the fact that steel has only one third the screening power of platinum, even if the steel screens of the same thickness of the platinum ones used by Pinch, viz. .3 mm., are employed, but, as a matter of fact, the steel needle-screen of the Dublin pattern is much thinner than this. Pinch's needle apparatus is likewise more efficient in that he uses emanation in his needles of twenty times the radio-activity of Drs. Stevenson and Jolly. If it be confirmed that these emanation needles thinly screened really do substantial good and no harm they would have a wide field of application in the throat for embedding in growths of the larynx and pharynx, but corroboration is needed before we should be justified in recom-

mending a method which is directly opposed to current practice which almost always includes the use of the thick screen to cut off all the alpha rays and most of the beta.

In addition to the employment of an apparatus containing an adequate amount of either radium salt or emanation adequately screened, it is also important to secure the apparatus immovably in the desired position. A tube which was insufficiently moored, if it were moored at all, was recently reported from Lancashire as having broken loose from the post-nasal pharynx, passed into the stomach and retrieved after several days by laparotomy from the small intestine. This shows the advisability of securely mooring the apparatus either by a cord or by a flexible silver style. The latter should always be used in the œsophagus.

In reference to the latter point it was recently reported from Vienna that a radium tube had actually passed from the gullet into the stomach, from whence it was recovered by gastrotomy. Now, although this tube had been inserted through the œsophagoscope in approved fashion, the tube was only held in position by a silk string and on making traction on this to remove the tube the string broke and the tube passed down into the stomach. In this case the performance of the gastrotomy was prompt. Five or six years ago, Finzi and I were in the habit of applying the radium tube without a silver style in the gullet; we were not, however, content to rely on string to keep it suspended at the right spot and to facilitate removal, for we used a long rubber drainage-tube, one end of which was closed and contained the radium apparatus, while the other end passed upwards and out of the mouth, where it was firmly secured, and there was no chance of such an apparatus finding its way into the stomach. But there were obvious disadvantages in the arrangement, which we soon discovered. If the apparatus was inserted through the œsophagoscope under an anæsthetic and vomiting followed later whilst the tube was in position, the latter was liable to be shifted upwards out of the stricture to a healthy part of the gullet above, and this actually happened on one occasion when vomiting occurred during the night and the nurse failed to report the fact. Admittedly, the flexible silver style which we have used for the last five years is not so comfortable for the patient as a rubber suspender without a style, but the style effectually prevents shifting and enables the radium tube to be drawn up after ten or twelve hours' exposure from a lower part of the stricture to another point, say 2 or 3 cm. higher up, and this almost invariably has to be done if the whole

of the tight part of even a moderately long gullet stricture is to be effectively dealt with.

Our object should always be to irradiate the whole of a growth. This either requires the use of several applicators simultaneously, or, if only one or two are available, the shifting of position after one area has been radiated to a fresh one. It is sometimes stated—without qualification—that the most effectual way of irradiating a growth is to insert one or more tubes into its substance. Less radio-activity is undoubtedly lost by such an arrangement, but the best thing to do in any case is not necessarily to forthwith embed a radium tube in it. Embedding *may* be necessary, but if the growth can be thoroughly irradiated without recourse to it, then embedding should usually be avoided as there is always the danger of sepsis, and that often proves a very disastrous complication of a radiated wound, and may be characterised by persistent sloughing and a tendency not to heal. There is always a greater chance of an embedding incision remaining free from septic sequelæ when the incision is made through healthy skin than through mucosa. In the case previously mentioned of sarcoma of the base of the tongue, which disappeared so rapidly, the tube was inserted and removed without subsequent sepsis through an incision of the skin above the hyoid bone. In that case, the tumour was of such a size that the whole of it could not be effectually irradiated by surface applications and embedding was a necessity, but as a cutaneous route was available, that was chosen rather than the mucosal one. In large growths of the fauces and pharynx, surface applications should be employed, unless they are too large and deep, and in them embedding from the mucosal surface may be unavoidable. In the case of a growth of the tonsil—too large for surface applications—it is probably worth the trouble to embed through an external incision, near the angle of the mandible, rather than employ the buccal route.

Tumours of the antral cavity necessarily have to be treated by embedding the tube. I recently treated an extensive epithelioma originating in the left antrum, extending into the nasal cavity, the ethmoidal cells and naso-pharynx, by inserting one tube of 100 mgrms. of radio-bromide through a breaking-down area over the hard palate into the antrum; another of 50 mgrms. was inserted into the same cavity by the inferior nasal route, a small tube of 20 mgrms. was placed in the ethmoidal region, and a fourth of 50 in the naso-pharynx. As the growth was fungating, it was felt that a long exposure of forty-eight hours could be made. As the

result the antrum was clear after a few days of all apparent growth. There was no sloughing, merely a thin yellowish pellicle here and there; the nasal cavity was quite free, though formerly blocked, and actually looked normal; and the post-nasal space contained little remains of disease. Unfortunately, the growth must have already invaded the cranial cavity—although we had not suspected it—for the patient died shortly afterwards from intracranial pressure. The remarkable point about this case was that the growth—though an epithelioma—reacted immediately after the manner of a round-celled sarcoma. There is usually a longer latent period in carcinoma.

In contrast with this case—in which embedding had to be resorted to—I can mention two cases of my own, and one of Mr. Graham's, of sarcoma, in which rapid disappearance took place after surface applications only.

A private patient, aged fifty, was recently referred to me by Mr. Worthington, of Exeter, a diagnosis of round-celled sarcoma having been made by him two days previously after exploratory incision through the cheek and microscopic examination. The tumour was hard and about the size of one moiety of a hen's egg bisected through its long diameter; it apparently grew from the periosteum, covering the outer surface of the anterior antral wall and the adjacent part of the nasal process of the left maxilla. On palpation under the lip it was found to fill the canine fossa, but not to involve the alveolar region. Dr. Finzi would not agree to embedding in this case, although this could easily have been done sub-labially; he expressed the opinion that it would rapidly disappear by surface applications, which would have to be short to avoid causing the least burn to the mucosa or to the skin. A tube of 100 mgrm. of radium bromide, screened in 2 mm. of platinum, was sewn into position under the lip, well up against the canine fossa part of the tumour, and retained there by two stitches passing through the mucosa of the lip and of the alveolus; another tube of 50 mgrm. was inserted into the left nasal cavity, and packed into position opposite the growth on the adjacent nasal process of the maxilla. These tubes were left *in situ* for eight hours, and were then each transferred to the skin and allowed to remain on for twelve hours in their new positions. Twenty-four hours later the growth had apparently gone, and certainly two days later not the least trace of the former hard tumour could be detected by careful palpation externally on the cheek and under the lip.

In another patient, with an enormous round-celled sarcoma originating on the left side of the post-nasal pharynx, sent me by Mr. Martineau, of Brighton, the growth reached down to the level of the epiglottis, and pushed the soft palate and uvula to within an inch of the incisor teeth; the patient swallowed food with great difficulty, and he was wearing a tracheotomy tube, as he was unable to breathe through either the nose or mouth; he was also deaf in both ears. Radium tubes were passed through each nostril on the anterior aspect of the tumour, and two more were inserted at the same time through the mouth into the upper pharynx behind the tumour. The tubes, aggregating 300 mgrm. of radium salt in 2 mm. screens of platinum, were retained for forty-eight hours. When examined at the end of ten days swallowing was normal and breathing was perfect without the

canula; both nasal passages and the upper pharynx were free; he could hear perfectly in the right ear and fairly well with the left—the side from which the growth sprang, but the left side of the soft palate was still thickened, and there was evident invasion of the left maxillary tuberosity and of the adjacent pterygoid plates. A further application was made to these areas with a good effect at first; although the growth did not recur in the pharynx it continued to advance in the maxilla towards the malar process, which was unchecked to the same extent by an external application of 200 mgrm. two months later; the pain, though not abolished, was much relieved. He died fifteen months later from a rather sudden rapid increase of the growth in the upper jaw.

In the mesopharynx and entrance to the larynx I have seen in three cases of epithelioma marked diminution of the tumour, with great subjective functional and objective relief; the vestibule of the larynx and glottic region, which could not be seen with the mirror before radium treatment, later appearing well open instead of blocked, and the urgent necessity for tracheotomy in each case removed.

In a case of epithelioma of the right side of the base of the tongue and adjacent pharyngeal and facial region marked diminution to the normal level took place though there was never complete disappearance in spite of two applications of 100 and 200 mgrms. respectively at six weeks' interval. The glands in the sub-mandibular region were also treated, and markedly diminished. The patient lived two months, and died from asthma and chronic bronchitis before any marked growth had taken place.

In two cases of epithelioma at the junction of the larynx and pharynx involving the vestibule of the larynx and the pharyngeal aspects of the aryepiglottic fold and arytenoid region, mostly on one side, no good followed. In one case the patient died on the fifth day from septic pneumonia and in the other case the radium had no effect whatever on the growth.

In epithelioma of the post-cricoidal pharynx I have had two remarkably good results and in two others substantial temporary improvement, whilst in four other cases there was no obvious benefit.

The two in which there were gratifying results are worth recording, and it is worth mentioning that the clinical diagnosis of epithelioma was in each instance confirmed by microscopy.

An old gentleman, aged eighty-one, was referred to me in August, 1910, by Dr. Jenkins, of Hickey, with a cancer in the deep pharynx, and was seen with the mirror as a typical cancerous growth springing from the pharyngeal aspect of the left arytenoid, and filling up the left pyriform fossa. On endoscopic examination under general anaesthesia it was found to involve the left half of the post-cricoidal

part of the pharynx, and ulceration extended to just within the mouth of the œsophagus, *i. e.* just below the lower edge of the cricoid. With Struycken's type of long scissors and with large punch forceps the mass of the growth was removed there and then. I did not, however, proceed to the application of radium immediately after operation, but waited for three weeks, until the effects of traumatism had passed off and the wound had apparently healed.

The placing of even a well-screened radium tube immediately into the bed, from which a cancerous growth has been removed, for the purpose of destroying malignant areas left behind, is a very bad practice, and may lead to prolonged sloughing with sepsis, and a wound which will not heal. Tissues which are non-cancerous are resistant to moderate irradiations when normal, but tissues which have just been subjected to considerable and recent traumatism are often susceptible to the action of the gamma rays, and the most disastrous complications may ensue.

In this case three tubes were tethered up unicorn fashion, the single one just entering the œsophagus, and the other two were in the deep pharynx—one in the middle line and the other in the left pyriform fossa. The tubes were allowed to remain in position for eight hours, and the application was repeated six weeks later. At the end of two from the first application not a trace of ulceration or of growth could be seen, and his swallowing became normal. A small gland treated from the skin surface almost disappeared. The throat was examined from time to time during the twelve months ensuing after operation both with the mirror and with the endoscope, and no recurrence could be detected. About eighteen months after he first came under observation, he noticed that he had a slight pricking sensation on swallowing. Under a general anæsthetic we found ulceration in the deepest part of the post-cricoidal pharynx, and the œsophageal involvement had undoubtedly extended downwards. One tube of 100 mgrm. with the usual screening was applied for twelve hours. Unfortunately the patient had a bad attack of bronchitis, and he succumbed to heart failure within a week. It was probable that the anæsthetic, C E. mixture, was responsible for this unfortunate termination.

That radium had a markedly beneficial though temporary effect on this patient no one connected with the case had any doubt.

In a gentleman whom I treated in conjunction with Dr. Maclay at Newcastle in December, 1912, there was an epithelioma causing dysphagia springing from the pharyngeal aspect of the arytenoids, and involving a good deal of the post-cricoidal region, but not extending to the gullet. Two emanation tubes, equivalent to 100 mgrm. of the metal, were inserted for nine hours. The lumen became so increased that all dysphagia disappeared and remained normal till his death from cerebral hæmorrhage a year later. With the mirror it could be seen that the site of the growth was occupied by a whitish and scar-like, but somewhat raised, surface.

Regarding the palliative treatment of malignant stricture of the gullet, in a communication I made to the Medical Society of London early in 1911, I claimed that out of twenty-one cases of malignant growths in the œsophagus, three showed temporary disappearance after radium therapy of naked eye objective, and radiographic evidence of the growth, together with the temporary disappearance of all subjective symptoms for many months, and in

a few instances for about one year or more. My most striking case is that of a woman with an endothelioma in the thoracic gullet who has had nine applications of radium salt during the last four and a half years. All fungation and ulceration disappeared after the second application, though there has been definite recrudescence from time to time which has yielded to treatment. At the present time the lesion looks just like an ordinary fibrous stricture, both endoscopically and radioscopically. Such a gratifying experience is exceptional, but the functional relief is often so great in cases not too far advanced that we have in radium a valuable method of palliative therapy which can be applied to cases which are practically always beyond surgical aid, and in which all we can hope to do is to relieve the difficulty in swallowing.

In my second series of twenty cases, as yet unpublished, the palliative results were as striking and as numerous as in the first series.

My experiences with radium in epithelioma, whilst confirming those of other observers that its action is uncertain, and that some such tumours react and some do not, yet they are on the whole sufficiently encouraging to compel me to differ from those who sweepingly assert that radium therapy is so disappointing as to be hardly worth trying in epithelioma of the throat. I admit, however, that my slight but gratifying experience with surgical diathermic coagulation in the fauces and pharyno-larynx lead me to agree with Mr. Harmer and Dr. Lack that diathermy has a much wider field of application than radium in these areas, and should be the palliative method of choice in most cases, though radium may usefully be employed as an adjunct. In the œsophagus the converse is the case.

THE TREATMENT OF INOPERABLE CASES BY MEANS OF X-RAYS.¹

BY DR. JOHN MACINTYRE.

(*Abstract.*)

(a) WHAT do we mean by inoperable cases of cancer? There are four classes of cases that come under every surgeon's observation: (1) Those that are operated upon successfully; (2) cases after

¹ British Medical Association Meeting at Aberdeen, July, 1914. Discussion on "The Treatment of Inoperable Growths of the Nose and Throat."

operation where there is more or less recurrence; (3) cases which, after operation and recurrence, surgeons declare inoperable; (4) untreatable cases in which no treatment whatever can be of any avail. (b) What class of cases do we usually get? By universal consensus of opinion surgeons were agreed that in the present state of our knowledge cases where the patient could be operated upon this should be done in the first instance. This view has been challenged of late. The result is that we rarely get cases in the early stages and are consequently left with the inoperable or untreatable cases, which do not give X-rays or any other agent the same chance. (c) In judging of the results in cases in which we try the X-rays in the choice of an agent, we meet with many difficulties: (1) One agent, whether X-rays, radium, or carbon dioxide, does not probably always act in the same way in different tissues nor in different subjects, and a like observation might be made about the stage of advancement of the disease. (2) The tissues themselves vary; the mesoblastic layer differs from the endo-epithelial and epithelial. (3) The different parts of the body seem liable to different diseases. For example, why should primary carcinoma of the nose be so rare when it is so common in the digestive tract? Why should the lungs also enjoy such an immunity?

(2) *Diagnosis* should be confirmed by every possible test.

(3) *Results*: (a) *Rodent ulcer*.—As early as the year 1896, in the Royal Infirmary I had one of the first; only two failures in this affection and both after surgical treatment. (b) *Round-celled and other sarcomata*.—We have distinct evidence of some good results in these. (c) *Epitheliomata* of the lip, tongue, nose, and naso-pharynx. Cases where an opportunity of trying the X-rays in the early stage because the patients refused operation (proved by section) with good results. (d) Glands following operation.

(4) *Conclusions*.—(a) We have undoubtedly evidence of cures in early disease and the patients have lived for a long time afterwards. (b) On the other hand, after a great many experiments and having seen many cases of malignant disease treated by X-rays I frankly admit that the results would not justify me in saying that we have for inoperable cases in X-rays a cure, but that there has been arrest or diminution of growth, relief from pain, arrest of hæmorrhage, and in conjunction with other agents prolongation of life, no one can doubt. (c) It was perfectly clear in the past that the nearer we were to the epithelial structures or the surface, the better results we got, although the

results have not been very promising in the mucous membranes of the respiratory tract or in the region of the œsophagus. As a result, I have often preferred to use other agents, such as radium, diathermy, frozen carbon dioxide, and the choice was often largely influenced by the anatomical conditions or regions affected. (d) It should never be forgotten that we can combine operation with any of these agents.

(5) *Prevention of disease.*—In view of what has been stated above, prophylactic treatment by means of radium or X-rays subsequent to operation might be more frequently employed. For the reasons given X-rays have not been found to be very satisfactory in malignant disease of the upper respiratory tract and œsophagus, but it is too soon to come to a conclusion or to give up the investigation. When we are asked such a question as we are now discussing, and particularly when we refer to X-rays, we have to ask ourselves what do we mean by X-rays? It is perfectly clear, and most men hold the view ever since Röntgen's discovery that the condition inside of an X-ray tube, properly excited, offers a very complex study. We have the alpha, beta and gamma rays and others—some may be corpuscular, not yet determined. In the past we were working in the dark. Each operator judged for himself what to do. Was he to use a low tube or a high tube? Was he to protect the superficial tissues as much as possible, and try to get only at the deeper ones? Some said we could get no result unless we had distinct evidence of reaction, and this reaction, I need hardly say, might mean mild irritation or severe burning. Now, we all know that a new era has been opened up within the last two years. We have been screening patients' tissues from the alpha, beta and destructive rays, and only using the deep-seated curative ones.

Physicians and obstetricians have been successful, not only in fibroid tumours but in malignant disease, in arresting growths in deep-seated parts of the body without injury to the superficial tissues. This work necessitated the production of large doses of X-rays, and consequently huge coils with cooling apparatus to get rid of the great heat developed in the primary. Coils had to be made to stand the enormous currents, mechanical stands have been made to distribute the rays over any part of the body we wish them, methods of measurement have been devised which give a certainty of dosage never attained before, so that we can now work with the rays on the surface or at a certain depth through the tissues to an extent of accuracy that five years ago seemed

impossible. It is thus premature to say that the X-rays have proved to be useless in malignant disease of the nose and throat. On the contrary, I think the work is only beginning.

Critics, too, are often inclined to speak of these forces as if they were different agents. Are they? Let us think for a moment how many things are common to radium and X-rays—such as the production of different rays, the alpha and gamma, and only the other day Dr. Laue discovered an entirely new line of research, which seems to be the beginning of a revolution in our ideas of X-rays. Already physicists are producing spectras of the X-rays, and for the benefit of those who look upon light treatment, whether it be from the sun or a violet-light lamp like Finsen's, we now know, thanks to the work of such men as Laue, Bragg, and others, that we have X-rays of the same nature as the waves of invisible light: that is, they are electro-magnetic waves in ether, and apparently the wave length of X-rays is about a thousandth part of the shortest light rays, or, as Professor Soddy has pointed out, less than one-sixth of the diameter of an atom, whereas the waves used in wireless telegraphy may be miles in length.

CASE 1.—A young man, aged twenty-four, was suffering from sarcoma at the back of both nostrils which involved the naso-pharynx. The case was looked upon as inoperable. He was treated by means of the X-rays. The face and other parts were thoroughly protected, and glass specula were introduced into each nostril; the X-rays were passed directly through the nose, and in the course of time the sarcomatous tumour entirely disappeared. He was quite well one year afterwards, and since then we have lost trace of him. The diagnosis was confirmed by microscopic examination, and there can be no doubt that the tumour, which appeared to be rapidly growing, disappeared under treatment.

CASE 2.—*Round-celled Sarcoma.*—The patient was a man, aged twenty-nine, and the report is as follows: The naso-pharynx is fairly well blocked, and nodules extend down the posterior wall and are just visible. For six weeks past a gradual blocking of the nose, interfering with nasal respiration and altering the character of his speech, was observed. Ten days ago a slight hæmorrhage from the naso-pharynx coming by the mouth, and not at all from the nose, alarmed him, and caused him to consult Dr. Kerr Love, who removed a portion of the tumour by means of a naso-pharyngeal punch. This was examined microscopically and found to be lympho-sarcomatous in character. Treated with X-rays all round the side of neck and throat and inside the mouth. Three weeks later patient reported great improvement in breathing by nostril, and speaks much more freely. There never has been any pain. Six months later patient reported himself as keeping well.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

March 6, 1914.

DR. D. R. PATERSON, *President, in the Chair.*

Tonsils from a Case of Lymphatic Leukæmia.—H. J. Davis.—

The specimens were suspended in Frost's solution: sodium fluoride 80 grm., chloral hydrate 80 grm., potassium acetate 100 grm., cane-sugar (Tate) 2500 grm., saturated solution of thymol in water 8000 c.c. The solution preserves the natural colour of the preparation, and was used for that purpose. The specimens were taken from a boy, aged seven. The lymphomatous nodules in the gland substance were well seen.

Preparation showing the Left Recurrent Laryngeal Nerve involved in a Mass of Lymphomatous Glands.—H. J. Davis.—

Total recurrent paralysis was observed before death. The case, that of a child, aged two, was admitted as a case of foreign body in the bronchus. There was dyspnoea, stridor, and collapse of the left lung. I examined the bronchial tree, but failed to find any signs of a foreign body. Repeated X-ray skiagrams gave a negative result. Later the left recurrent laryngeal became paralysed, left abductor paralysis, and later still, as the paralysis became complete, the left cord assumed the cadaveric position. A low tracheotomy was performed. Not much relief was obtained, but the child lived three weeks afterwards and died suddenly. The preparation showed that the lung was collapsed, that the lumen of the bronchus was partially occluded by glands, and that the recurrent nerve was flattened, expanded, and inseparably united with a mass of glands on its upward course to the larynx.

In this case, as the left lung was collapsed and almost functionless during bronchoscopy the "mist" hung in the left bronchial tubes for some time, whereas when the right bronchi were similarly dealt with the vapour was rapidly indrawn or expelled. This might almost be used as a test as to whether air was passing into a bronchial offshoot or not.

This is the youngest patient in whom I have observed left total recurrent paralysis.

Sir FELIX SEMON said the specimen was a veritable museum of pathological curiosities. To begin with, it was surprising that recurrent laryngeal paralysis should be so seldom met with in children, bearing in mind the frequency of enlargement of the cervical and bronchial glands in children. Secondly, he was pleased that Dr. Davis had been able to actually observe in this case the transition from abductor paralysis to complete recurrent laryngeal paralysis. The number of cases in which such a transition had been actually observed was still small. The third point was, that in the case of this child unilateral laryngeal paralysis had given rise to dyspnoea. True, it was not a pure case; for there was—which was the fourth point of interest—a double stenosis; above, in the larynx the narrowing, due to the unilateral paralysis, and below, direct

compression of the lower air passages, due to the pressure exerted by the lymphomatous glands on the trachea and left bronchus. That lower stenosis was the reason also why the tracheotomy which had been performed gave so little relief. Though it relieved the upper stenosis one could well see it could not have relieved the lower. Perhaps the most interesting feature about the case was that even unilateral paralysis in a child might produce dyspnœa. There were very few cases of this on record. Many years ago (1884) he had attempted a collective investigation concerning this point in the *Internationales Centralblatt für Laryngologie*, but the replies he received were unsatisfactory. The whole question was interesting, because it bore on the observations made fully one hundred years ago by Legallois, showing the enormous difference in the calibre of the larynx in young animals compared with that of the adult. Legallois performed experiments by cutting the recurrent laryngeal nerves in animals of different species, such as dogs, cats, and rabbits, within a few days of birth. Whilst there were considerable differences with regard to the species of the animals experimented upon, it might broadly be stated that very young animals perished in periods ranging from a few hours to a few days, while when the same experiment was performed on adult animals there was some degree of dyspnœa, but not a very considerable amount. Similarly, in human beings, an adult could easily bear an amount of narrowing of the larynx which in a child caused severe dyspnœa. This was well shown by Dr. Peters' case, demonstrated at that day's meeting, in which there was complete abductor paralysis in an adult, yet no trace of dyspnœa.¹

Mr. HERBERT TILLEY explained that he was once in a similar predicament to that described, owing to the bubbling of mucus at the lower end of the tube. The bubbles were at once dispersed by a mop of wool moistened with ether, and thus he was enabled to see what he was looking for.

Dr. BRONNER asked whether the glands could be removed by operation? He saw a distressing case some years ago in which a boy died owing to first one bronchus and then the other being pressed on. All kinds of tubes were tried.

Mr. WAGGETT quoted the case of a small child with tracheal compression by (presumably) tuberculous glands, verified by direct tracheoscopy. After a few months at Margate dyspnœa disappeared, and direct tracheoscopy showed a normal lumen.

Sir FELIX SEMON said he had once been associated with Lord Lister in such a case. Lord Lister made many experiments on dead bodies to see if he could get down far enough to remove those glands. Ultimately they went to Brighton for the purpose of removing them, but they had meanwhile disappeared.

Sir STCLAIR THOMSON said the small size of the larynx and trachea in children could scarcely be believed. When he was writing his textbook he asked Mr. Fraser, of St. Mary's Hospital, to get him the larynx of a newly-born infant. It was split longitudinally and hardened, and he said it was not shrunk. It was sent to the artist to make a drawing of it, and when the drawing came he could hardly believe it was true to model. He had to get two or three specimens before he was sufficiently satisfied, so narrow is the glottis of an infant.

The PRESIDENT (Dr. D. R. PATERSON) said he mentioned a case at a former meeting, where there was a double cause of stenosis. When a

¹ See p. 510.

bronchoscopy tube was passed beyond the paralysed cords very definite stenosis was found at the root of the trachea. In regard to the differences between the calibre of the human trachea and larynx and that of lower animals, there was an interesting paper by Némai, of Budapest, in which it is shown to be largely due to a change in the form of the arytenoid. In the lower animals this is a flat, concave, cartilaginous plate, which allows of great distension of the posterior part of the rima glottidis—the so-called cartilaginous glottis, which plays the most important part in inspiration, and permits the glottis a much wider airway than in the human. On the other hand, the human voice, with the consequent great development of the larynx, has only been acquired at the expense of curtailing the airway of its possessor.

Dr. H. J. DAVIS, in reply, said it was in consequence of seeing Mr. Hope's case at the last meeting that he decided to show this. He expressed the view on Mr. Hope's case that it was one of double abductor paralysis, due to a condition such as was present in this case. It was really surprising how any tube could pass through a child's glottis, as it was so very small, but after passing the larynx it was easier to proceed.

Two Primary Sores on the Lip and Angle of the mouth.—H. J. Davis.—The patient was a girl, aged twenty-two. The case was promptly treated with neo-salvarsan, and the usual severe symptoms met with in these cases were not observed.

Necrosis of the Palate.—H. J. Davis.—The patient was a man, aged seventy, who said he was kicked in the face by a pony when aged ten, and necrosis of the palate took place. He has worn an obturator ever since, and when this is removed a perfect view of the nasal fossæ and turbinal bones can be observed.

The PRESIDENT said he supposed it was congenital specific disease: it had been corrected in a remarkable way by the obturator.

Abnormal Artery on Wall of Pharynx.—H. J. Davis.—The patient was a man, aged fifty. A large pulsating vessel is seen on the posterior wall of the pharynx—it appears too large for the ascending pharyngeal artery. On ordinary laryngoscopy the bifurcation of the trachea and both bronchi are seen with the greatest ease.

Mr. HARMER thought it was a complete coil in the internal carotid artery. Such a coil was frequently seen in the dissecting room. A few meetings ago he mentioned a case in which the house-surgeon at a hospital mistook such a loop for adenoids, and removed it with forceps. There was a great gush of blood, and the patient collapsed. Three hours later, though the child was still on the table, the bleeding returned, and death occurred in ten seconds. *Post mortem* it was seen that the coil had been completely removed, so that the two ends of the artery were $\frac{1}{2}$ in. from each other. On the other side there was a similar coil, which projected towards the pharynx.

Destruction of Nasal Septum.—H. J. Davis.—The patient was a woman, aged forty-five, who had lost the septum as well as the columella of the nose. When the face is raised the appearance to which this gives rise is peculiar. The symmetry and curves of the *alæ nasi* are well shown. It can be noted that loss of the bony and cartilaginous septum does not necessarily produce sinking in of the bridge of the nose. This has a bearing on the extent of the septal partition, which can safely be

removed in submucous resections without risk of external deformity. The external appearance of the nose in this patient is quite good, in spite of complete loss of intranasal support.

The PRESIDENT said he had a similar case which came to him at an early stage. He thought some sinking would come on as a result of contraction after healing. This patient he spoke of was treated at once by salvarsan, which led to a rapid healing, but he was disappointed on account of the subsequent sinking.

Dr. F. DE HAVILLAND HALL said the case reminded him of a disastrous one he had when he commenced throat work. A lady was sent to him from the country with commencing mischief in her nose. He made an examination, using cocaine so that he could obtain a good view. He wrote an unfavourable report to her doctor, advising energetic treatment. The course was rapid, and in a week the bridge of the nose had fallen in. The blame for that was laid upon him, for it was said he used a caustic application for the examination, and he never saw the patient again.

The PRESIDENT said he did not think there could be much doubt that the lateral cartilages were ample support for the bridge of the nose, so that one could remove practically the whole of the septum without any falling in. In this case, as in so many others, the contraction seemed to be taking place first of all just where the cartilage joins the bone.

Dr. H. J. DAVIS replied that he was surprised to see the change in the case, and he admitted that there was retraction now; he saw the patient last five weeks ago, and the condition then was as stated in the notes.

Empyema of the Antrum with Infection of the Nose and Cheeks.—H. J. DAVIS.—The patient was a woman, aged thirty, with redness, infiltration, and œdema of the nose and both cheeks of six months' duration. I mistook the case for one of lupus erythematosus. There were shadows on transillumination, but this might have been accounted for by the extreme thickness of the infiltrated integuments. Dr. Pernet, who saw the case, disagreed with my diagnosis, and suggested an empyema of the antrum and a septic infection of the integuments therefrom. This, on intranasal puncture, proved to be the case. The condition is one of chronic symmetrical lymphangitis with blocking of the lymphatics from a septic focus in the antrum.

The PRESIDENT said the case was interesting, as being the type usually described in text-books as antral disease, a form which was but rarely seen.

Mr. HOPE asked whether Dr. Davis punctured the other antrum as well, because that looked the more unhealthily of the two.

Mr. HERBERT TILLEY referred to the records of a case of solid œdema of the face, which would be found in the *Transactions* some years ago; the man's eyes being almost closed by the œdema. The speaker tried to find a septic focus which might account for the lymphatic obstruction. The search was unsuccessful, but someone had opened the left frontal sinus without finding any disease there, and naturally the œdema did not disperse.

Mr. O'MALLEY said he recently saw a similar case in a girl, aged sixteen. The history was that œdema began on the right side of the face, and spread from below; and later the left side of the face was involved. There was some excoriation round the anterior nares, which did not look healthy, and he believed it to be lymphatic obstruction due to sepsis.

Nothing was found in the antrum, but a vaccine was made from the cultivation taken from the nose. The case, however, had not improved.

Dr. PETERS said the swelling was on the right side of the face, and there was also a fissure of the nose on that side, which was probably the origin of the absorption. In cases of obstruction of the lymphatics of the nose there was usually a history of fissure or of boil infection.

Dr. DAN MCKENZIE doubted the diagnosis altogether. He would require more proof before accepting the view that the face œdema was secondary to the antrum suppuration.

Dr. KELSON asked whether a Wassermann's test had been done. He had seen a similar case, which turned out to be syphilis. The condition was removed by iodide of potassium.

Dr. H. J. DAVIS replied that he punctured the other side also, but nothing came away. There was a marked shadow on both sides of the face, and he considered that was mainly due to the thickened integuments. The skin was infected from the nose, from which there was a purulent discharge on one side. He did not see why this should not affect both sides of the face, as in this instance.

Malignant Disease of the Ethmoid extending along the Antral Roof and Perforating the Maxilla at the Outer Angle of the Orbit.—H. J. DAVIS.—The patient was a woman, aged forty-four. There was a large tumour over the malar bone with nasal polypi; on curetting these away the left ethmoid came away *en masse*. The disease was obviously malignant. The antrum was invaded, but the growth tracked along the upper antral wall, clinging to the bone and perforating the malar prominence. The lower parts of the antrum were not affected. A second more extensive operation was performed a week later, and so far there had been no recurrence. An X-ray plate by Dr. Morton showed the line of invasion. The outer angle of the antrum was seen to be eroded by the tumour.

The PRESIDENT said these cases raised a point of considerable importance—namely, as to the best method of getting access to the growth. He had used Denker's method of approaching it through the antrum, but that was not sufficient, as it did not take one high enough up. Moure's incision round the angle of the nose, on the other hand, gave plenty of room for it. He did one by that route a few days ago, and found that the tumour, which began in the inferior turbinate, involved a large part of the anterior ethmoid, spreading up and invading the floor of the frontal sinus; he did not know of that involvement until the operation revealed it. Another question was as to the best means of preventing blood flowing into the back of the throat. Like most men, he had used a posterior plug for ordinary cases; but his experience was that it had to be of large size, and it depressed the soft palate so much that there was interference with the airway, causing difficulty with the anæsthetic. He had recently tried what was usually done in ordinary epistaxis—namely, plugging the particular nostril by a small plug attached by a string drawn through the anterior nares. The patient could make use of the unaffected nostril for breathing, which was a distinct advantage. It was not, however, suitable for all cases.

Sir STCLAIR THOMSON had recommended Moure's operation very frequently, but there were two points in these cases now shown which justified a further word. In one of them the lower part of the antrum was not affected, and the return of growth in the other was not in the antrum. He once made investigations in all the museums of London,

and found that the antrum was the last place in the nose and accessory cavities where malignant growth originates. The tearing out of the alveolus, which the general surgeon had been doing, was futile. If Dr. Davis were to remove a little for microscopic examination he would find there was recurrence in the ethmoidal region. In malignant disease of nose and accessory sinuses, nine out of ten originated in the ethmoidal region. Until people tried Mounre's operation, they would scarcely believe how directly they could get down to the growth and follow it to the base of the skull. They could only know they had arrived at cure when they could show cases such as he showed on two occasions, in which the inside of the nose was lined with smooth cicatricial tissue. One of his cases was aged seventy, and there had been no recurrence after over four years.

Mr. WAGGETT said, with regard to the incidence of disease in the palatal portion, there was a class in which malignant disease grew from the "rests" connected with the embryonic tooth organs. These burrowed in the substance of the palate. He had a case in which disease burrowed from one side to the other, and the entire palate had to be removed. He had seen sarcoma start in the floor of the antrum, but he thought it correct to say the majority of new growths started in the ethmoidal region. With regard to hæmorrhage, where this was likely to be dangerous he advocated crico-thyrotomy and a laryngeal plug.

Dr. DAN MCKENZIE asked whether Sir StClair Thomson, when referring to the common origin of malignant disease of the nose, included epithelioma as well as sarcoma. His own impression was that epitheliomata were more frequent in the superior maxilla and antrum, whereas sarcomata were more frequent in the ethmoidal region. He would again urge care before accepting the qualification "malignant" in regard to so-called sarcoma of the ethmoidal region. If these were sarcomata at all, they were of very low malignancy. True, they recurred locally, but showed little tendency to general dissemination, in which respect they differed strikingly from sarcomata of bone elsewhere in the body. The case he showed in November exemplified the excellent access which could be obtained from outside the nose. Though the tumour was vascular and the bleeding free, there was no trouble with blood running down, because that side was packed with gauze and so the tumour was isolated, as well as the field of operation, from the posterior pharynx.

Mr. E. D. DAVIS said that four years ago he had a similar case with Mr. Clogg, and that was an endothelioma of the ethmoid. Some considered it to be an epithelioma. A complete removal was done by commencing to excise the upper jaw, but the palatal process was left. The usual Ferguson incision of the cheek was made, and the whole facial surface of the maxilla was removed. The growth was followed up to the frontal region, and backwards to the sphenoid. The patient did very well for ten months, and then she developed a secondary growth in the brain, and died suddenly.

Mr. HARMER said that cancers might originate in the mucous membrane of the antrum, and the roof was a very common site; but they could also be found commencing on its nasal wall and floor. Though the antrum was lined with columnar-celled mucous membrane, when a growth was found there it was nearly always of the squamous-celled variety. On the other hand, carcinomata, starting in the ethmoidal region, were generally columnar-celled, at least in their early stages.

Dr. H. J. DAVIS replied that the section in his case showed it was a spheroidal-celled carcinoma, evidently the result of pressure on the

original cylindrical cells. The first operation consisted in removing polypi from the nose, and the lateral mass of the ethmoid came away with the curette. The tumour at the side of the malar bone was the size of a walnut. The case was first regarded as malignant disease of the upper jaw and it was referred to him to ascertain whether there was disease in the antrum. He did not think such a large tumour could be connected with the antrum, as it appeared to be quite separate, but the skiagram showed that the disease had tracked from the ethmoid along the lower border of the orbit, and perforated the malar bone. He removed the tumour, and was able to curette away the disease by again opening the antrum; and as the lower part of the frontal sinus was also affected, he curetted that also. As the patient was very emaciated he hesitated about doing any more. There was no bulging of the palate, and he made the incision on the outer side along the floor of the orbit. He removed the tumour with a scoop and cauterized with Paquelin's cautery, and curetted the ethmoid and cauterized that area as well. These growths of the ethmoid were but slowly progressing. He did not agree with Sir St Clair Thomson, because when disease started in the antrum the whole of the upper jaw was affected; but if it started in the ethmoid, secondarily invading the antrum, it hugged the superior wall, as in this case, and usually presented at the inner angle of the orbit.

Columnar-celled Epithelioma of the Nasal Cavity and Left Antrum.—**W. Stuart-Low.**—A man, aged fifty. *Pathological Report*: "The epithelium is of columnar type arranged in irregular tubes." This case illustrates the slowness of the growth of a tumour of this nature and its non-liability to infiltrate and spread to other parts, also its great tendency to recur locally. Three thorough operations have been performed, the first (three years ago) when the antrum was cleared of a mass of growth by the canine fossa route, the ascending process of the superior maxillary bone being removed to give a better view and access. At this operation it was found that the inner wall of the antrum had been destroyed by the disease, and the inferior and middle turbinals involved. In a year he returned with a recurrence in both antral and nasal cavities. A similar operation to the first was performed, and now after a lapse of two years there is again a return of the growth in the nose, but not in the antrum.

Laryngeal Tumour; (?) Adenoma of Right Ventricular Band.—**Herbert Tilley.**—Male, aged fifty-two, complained of hoarseness of ten to fifteen years' duration. No symptoms suggestive of tubercle. Wassermann reaction negative. Note made August 11, 1913: Right ventricular band uniformly swollen, slightly congested, not ulcerated. Only posterior one-sixth of right vocal cord can be seen, and it moves freely on phonation. Note, January 10, 1914: Right ventricular band is swollen to such an extent in its anterior five-sixths that only the posterior end of the vocal cord can be seen. Swelling is of globular shape, smooth, pale, and covered with a pale secretion. A small papillomatous growth can be seen on the anterior half of the left ventricular band. I removed a considerable portion of the right-sided tumour by the direct method, under local anæsthesia.

Pathological Report.—"The tumour is apparently of the nature of an adenoma originating from a crypt in connection with the ventricle."

Mr. HERBERT TILLEY added that when he had removed the piece from the right ventricular band he could then see practically the whole

length of the right cord. There was now some interarytænoid thickening and a rather congested-looking left cord. The Wassermann reaction was negative. The patient was such a fine specimen of manhood that tubercle seemed unlikely, especially in the absence of any physical signs in the lungs.

Mr. ROSE said that, having examined the microscopic specimen, he would scarcely use the word "adenoma"; it seemed to him to be a chronic inflammatory thickening.

Sir FELIX SEMON said that if he had simply seen the case and been told nothing about it, he would have said it suggested tubercle.

Mr. E. D. DAVIS said that he had had a very similar case to that shown by Mr. Tilley, a growth limited to the left ventricular band. The case was followed up, and proved to be tuberculosis.

Mr. HERBERT TILLEY said the man was in good health, there was no cough or general weakness, and it was difficult to believe the condition was tuberculous. He thought the inflammatory appearances in the section might be due to the mechanical irritation.

Frontal Sinus Burrs for Enlarging the Fronto-nasal Canal when Operating by the Intranasal Method.—Herbert Tilley.—The instruments are shaped like the ordinary frontal sinus probe, and the posterior and superior aspects of the burr are planed off so that it is practically impossible to damage posterior wall of the frontal sinus.

Mr. TILLEY added that until a few days ago he was under the impression that the instruments were unlike any he had hitherto seen, but he had since ascertained that an almost identical means of enlarging the fronto-nasal canal had been invented by a Dr. Sullivan in America.

Maxillary Antroscope.—Dan McKenzie.—An instrument modelled on the cystoscope, or naso-pharyngoscope, for examination of the maxillary antrum. It is introduced into the cavity through a trocar. The exhibitor had found difficulty in recognising detail during the examination, but believed the ability to do so would arrive in time.

The PRESIDENT said the instrument was, to him, an old friend. He started with Valentine's salpingoscope ten years ago, and used it eighteen months for examining the Eustachian tubes, upper and nasal fossa, naso-pharynx, etc., but he also found it difficult to get a comprehensive view of the parts. It was easy enough to pass the instrument through an opening in the inferior meatus into the antrum, but it was impossible to get a really good idea of what the interior was like.

Acute Suppurative Frontal Sinusitis, due to Bathing.—

C. W. M. Hope.—CASE 1.—Male, aged twenty, was admitted to hospital on September 23, 1913, at 8 p.m. *Condition on Admission.*—Left frontal region red and swollen; fluctuation present. Eye closed; œdema over maxilla. Marked tenderness over frontal sinus. Pus in middle meatus; anterior end of middle turbinal red and swollen. Septal deviation high up to left. Patient felt and looked very ill. Temperature, 98.6° F.; pulse, 76. *Previous History.*—Swimming four days before admission, followed day after by pain and swelling around left eye. Operation, 10.30 p.m.: Maxillary antrum punctured; full of pus; washed out. Incision made through eyebrow and continued down on to side of nose. On incising periosteum a large amount of pus escaped. Probing revealed a sinus through floor of sinus into upper part of orbit, periosteum stripped up into orbit for 1 in. and up to front wall of frontal sinus for 2 in.

Portion of floor cut away, also part of fronto-nasal process of superior maxilla to enlarge infundibulum. Bone of sinus walls did not bleed. The whole of inner lining of sinus was stripped off and found lying loose amongst pus. Anterior end of middle turbinal removed, large rubber drain inserted from nose into sinus, wound closed with silkworm-gut sutures. Pus on culture proved to be pure *Staphylococcus pyogenes aureus*. *Subsequent Progress*.—Swelling rapidly went down. Discharge from sinus, at first great in amount, soon diminished. October 1: 100 million mixed staphylococcus vaccine. October 7: 100 million mixed staphylococcus vaccine. November 1: Temperature, 100° F.; puffiness at inner canthus, catheter impassable. November 2: Temperature, 100·2° F.; more swelling; inner end of wound opened up, pus escaped; small tube inserted into sinus; removed at end of four weeks. November 27: Sequestrum felt in sinus with catheter. November 29: Radical Killian operation performed; whole of bridge and most of inner wall found to be necrotic, exposing dura. Fistula found leading into right frontal sinus. Wound sutured entirely except for tiny drain at inner canthus. December 31: Discharged cured. February 20: Deformity of operation markedly diminished; nose clean. There has at no time been any diplopia.

CASE 2.—Female, aged fourteen, was admitted to hospital on October 29, 1913, with œdema of left frontal region, eyes, and over maxilla.

Previous History.—Perfectly well until she went swimming on October 22. Next day had pain in nose and left epiphora; swelling appeared on October 28. Temperature 100° F., pulse 108, on admission. Fomentations, hot inhalations ordered. When seen on November 2 the left eye was completely closed; marked swelling on left side of face and left frontal region. Fluctuation over and around frontal sinus. Temperature 101·4° F., pulse 84. Left middle meatus full of pus and a few small polypi.

Operation same evening: Exactly similar condition found on operating as in Case I, but infection was a pure culture of streptococcus. Anterior ethmoidal cells being infected, they were cleared out.

Following operation patient shortly developed very marked mental symptoms, "terrors" by day and night, and difficult to keep in bed at times. Temperature varied from 98·2° to 99·8° F. Tissues became adherent to bone forming anterior wall of sinus and wound healed up by first intention. November 26: Temperature rose to 100·4° F. Some puffiness above eye. November 30: Wound reopened. Sinus found full of polypi and several sequestra. A large area of dura mater was exposed, covered with granulations. Sinus was carefully cleared of polypi and exuberant granulations and a drain left for four days at inner end of wound. Mental symptoms soon disappeared.

Except for a little infection of anterior ethmoid cells patient has now completely recovered. There was never any infection of the maxillary antrum. Slight diplopia in upper part of field only.

The PRESIDENT gathered that in both cases the patients were swimming in a bath, not in the sea. Some years ago there was almost an epidemic of accessory sinus infection as well as middle-ear disease, which developed in some into mastoid trouble as a result of bathing in a particular bath in one of the mining villages of South Wales.

Dr. DONELAN said that he found on inquiry that the youth was frequently in the habit of jumping into the water feet foremost, while the girl invariably did so. As well as he could remember, Sir StClair

Thomson was the only authority who had called attention in writing to the objections to this form of diving on account of risk to the sinuses.

Mr. WHALE thought that, as regards the girl, a second operation would be necessary, as there was much pus in the infundibulum at present. Her case almost exactly resembled a recent case of his. At the lower angle of the outer incision in this girl's case there was a tender lump, suggesting early keloid formation, and that was so in his case also. After the second operation the keloid thickening had spread so much that he had to ionize her with 2 per cent. sodium chloride through eight thicknesses of lint for twenty minutes, with a strength of 20 ma., once a week for five weeks, the negative pole being applied to the keloid scar.

Mr. NORMAN PATTERSON asked why Mr. Hope applied sutures in these cases. The best plan, he considered, was to leave the wound fairly widely open, and allow external drainage to take place. Subsequently very little scarring resulted. He did not think that immediate closure of the wound was a safe procedure.

Dr. PETERS asked whether Mr. Hope in future intended to leave open part of the incision and close it when the suppuration had settled down, or whether he would close the incision at the first operation.

The PRESIDENT said that in these cases it was difficult to know when all the necrotic bone had been got away. He had had cases in which it was necessary to open again, to give vent to pieces of bone. That was largely due to one's conservative instincts, because one operated to relieve tension and give the bone a chance to recover or to prevent subsequent deformity.

Mr. HOPE replied that the front wall of both sinuses was laid bare, and there was no periosteum on either side. He thought he would give the tissues a chance to readhere. He sutured them up again because he thought it would give the bone a chance of recovering.

The Influence of Pregnancy on Lupus of the Nose.—E. A. Peters.—Female, aged twenty-seven, first seen in April, 1913, with the history of scraping for lupus four years previously. Active lupus was observed around the nose and on the septum and outer wall. There was also a patch of ulceration to be seen on the right lateral pharyngeal band. The left false cord was swollen, and hypertrophic ulcerated tissue protruded from the region of the ventricle. Injections of B.E. from $\frac{1}{40000}$ to $\frac{1}{10000}$ mgrm. were carried out in two series up to November, 1913. The reaction was never great and the local conditions improved so that in the larynx only a slight fulness of the superior cord remained. A child was born January, 1914, and the present condition indicates a general relapse with consolidation of the right lung. The evening temperature ranges from 100° F. The feature of the case is the transition from lupus at the nares to tuberculosis in the lung. The appearance of the larynx is of intermediate character and the process commenced in the ventricle. Is it necessary to invoke a double infection?

Mr. A. J. MARTINEAU said the case was of interest as showing the influence of pregnancy on cases of lupus. In a case which Dr. H. J. Davis saw with him, it became necessary to advise a young lady with healing lupus of the larynx as to whether she might safely marry. On general grounds the advice tendered was to postpone the marriage until sound healing occurred. The correctness of this advice was confirmed by the course of this case.

Sir STCLAIR THOMSON said it was not unusual for lupus, on marriage, to pass into tuberculosis of the lung. He had watched a case

of lupus for fifteen years. As long as the patient remained unmarried the lupus was kept well under control, but marriage and motherhood were accompanied by a rapid spread, and the development of symptoms in the chest. He agreed that these people should be strongly warned against marriage.

Dr. PETERS, in reply, asked whether it was a question of double or of single infection. In cases of lupus it was not uncommon to see a distribution of the lupus by the blood, and deposits in the skin.

Unilateral Abductor Paresis of the Left Cord.—E. A. Peters.—

A woman, aged forty-two, became suddenly hoarse three weeks ago and experienced a difficulty in swallowing fluids. General health good. Auscultation of the chest gave a negative result. On examination of the œsophagus a slightly ulcerated growth could be seen 8 in. from the teeth. Probably secondary glandular infection had involved the left recurrent nerve.

Tumour on the Left Vocal Cord.—James Donelan.—Patient, a woman, aged twenty-six, had been hoarse for several years. Operation on May 5, 1909, by Prof. Gradenigo, of Turin. Voice improved, but not clear. Had become again very hoarse in the last three weeks.

Mr. HERBERT TILLEY said he saw a white projecting point on the left cord, around which the cord was congested, and the cord was not moving so freely as its fellow. He would not be surprised if it proved to be intrinsic malignant disease of the cord. He advised that it should be examined by the direct method.

Mr. WAGGETT said he derived much the same impression as did Mr. Tilley; the spike of white might even prove to be a piece of cartilage coming away. Direct examination would leave no doubt as to diagnosis. The cord moved, but much of it had been cut away, and was at a lower level than the sound cord. It was a good case for the Killian's suspension laryngoscopy.

Dr. DONELAN replied that the case might be a late recurring papilloma. Such forms of papillomata recurring after five or six years were included in the second group of Brun's classification. He thought the perfect mobility of the vocal cord and the patient's twenty-six years were against malignancy. Sir Felix Semon, who had also examined the case, said that, in his opinion, whatever the exact form, it was certainly some benign neoplasm.

Abstracts.

NOSE.

Richardson, C. W.—Vaso-motor Disturbances of the Upper Air Tract. "Annals of Otology, etc.," vol. xxi, p. 817.

Insists upon the importance of the subject, and regrets the too frequent indulgence in cauterising and removing turbinates, even at the present day. Urges the necessity of diet, exercise, avoidance of over-work, and excessive nervous zeal, with mild local treatment. A very short paper, with a value in inverse proportion to its length.

Macleod Yearsley.

Ulrich, Henry L., M.D. (Minneapolis).—Some Notes on Hay Fever.
"Journ. Amer. Med. Assoc.," April 18, 1914.

From a review of the literature and a study of the disease itself, the author believes that hay fever is a hypersensitivity to a foreign protein, the irregularity of time, sequence and intensity of the symptoms suggesting the hypersensitivity of nerve and tissue groups to an irregular protein intoxication, the portal of entry of which is the nose. In other words the process is of the nature of a protein toxicosis.

Investigating the subject further Dr. Ulrich made an extract of ragweed pollen by means of Dunbar's method, with which he treated twelve cases of hay fever. His method was to inject 0.5 c.c. of a dilution, never greater than 1:500,000 nor less than 1:1,000,000, the latter dose being more satisfactory and safer. The patients in the majority of instances were relieved partially or wholly from symptoms in from fifteen minutes to two hours. This relief lasted sometimes a few hours, again for days, one week being the longest. There was a gradual improvement of symptoms in the majority of cases which cannot be explained wholly by a diminution of pollen in the air. From the manner of its production and its short duration the writer is convinced that a refractory or inhibitory phase of hypersensitivity was produced.

Birkett (Rogers).

EAR.

Sack, N. (Moscow).—A Case of Atrophy of the Ear associated with Mal-development of the Skull and Atrophy of the Facial Nerve.
"Monats. f. Ohrenh.," Year 47, No. 7.

A nine-year-old boy of poor development was brought to the author by his father, who stated that the left ear had recently become stopped. Examination revealed a typical tubal catarrh, and on the right side a most remarkable deformity of this ear and side of the skull, which consisted in a microtic auricle of about 3 cm. in length, no trace of an external meatus or mastoid process, whilst the posterior portion of the skull was flattened, and the parietal and occipital bones more strongly developed than those on the left side. The head was held in the position of torticollis towards the right side, there was a scoliosis of the neck with the convexity towards the right and a compensatory curve in the opposite direction in the thoracic region, and the usual asymmetry of the face. Paralysis of the upper half and paresis of the lower half of the right facial. Eye movements and pupils normal. Tongue normal. Sensation of the face and interior of the mouth normal. Paralysis of the right soft palate. Taste normal. Post-nasal space examined by palpation, normal with the exception of the presence of adenoids. Tuning-forks of under 200 vibrations were not heard *via* air on the affected side, and the perception for the lower forks *via* bone was much reduced. The deformity of the face and ear was noted soon after birth.

Sack considered that as the Weber test was not lateralised to sound side, and that as the sense of audition, though depreciated, existed on the affected side, that a tympanic cavity was present. He also regarded the facial paresis was due to some cause situated other than centrally, probably to pressure effects of the developmental arrest, and he further contends that the paresis of the soft palate is in favour of the view that

its innervation is *viâ* the geniculate ganglion, great superficial petrosal nerve and sphenopalatine ganglion.

The narration of this case forms the basis for a speculative discussion on the ætiology of the condition in this instance, and in others of a similar nature with the usual review of the literature available to the author on the subject.

Alex. R. Tweedie.

CORRESPONDENCE.

THE INTRANASAL OPERATIVE TREATMENT OF FRONTAL SINUS SUPPURATION.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—May I draw attention to the absence of a description in the Official Reports of the demonstration on my intranasal methods, which I gave on August 11, 1913, at the International Congress of Medicine in London, in accordance with the official programme of the Laryngological Section.

The operation by "anterior entry," which I described and illustrated in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, May, 1914, covers the ground of my demonstration at the International Congress; while a more recent demonstration, which I had the privilege of giving in the Laryngological Section of the British Medical Association Meeting at Aberdeen last July, is substantially the same, and hence hardly merits any further extended note in your reports of the proceedings of that meeting.

I have the honour to remain,

Yours faithfully,

September, 1914.

P. WATSON-WILLIAMS.

NOTES AND QUERIES.

COCAINE AND ADRENALIN DURING THE WAR.

We are obliged to Messrs. Duncan, Flockhart & Co., and to Messrs. Parke, Davis & Co. for the following information.

Cocaine.—The price of cocaine in England has advanced since the war broke out from 10s. to 15s. an ounce. This rise is chiefly due to the fact that the British Government has been purchasing large quantities of the drug. Cocaine is made from the coca leaf, which is cultivated in British India, Java, and South America, and supplies are expected shortly which will probably reduce the price of the drug. But a reduction to the figure prevailing prior to the outbreak of the war is highly improbable.

With regard to the synthetic local anæsthetics such as *Novocaine*, *Eucaïne*, etc., the stocks in England are sufficient to meet all ordinary demands. Consequently, the price of these articles has risen but slightly. Although hitherto largely prepared abroad, steps have already been taken to manufacture them in England for the future.

The price of the suprarenal gland extracts (*adrenalin*, *supra-renin*, etc.) has not so far been affected by the war.

THE
JOURNAL OF LARYNGOLOGY.
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

CLINICAL ASPECT OF OTOSCLEROSIS.¹

BY J. S. FRASER, M.B., CH.B., F.R.C.S. EDIN.,

Assistant-Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh;
Lecturer on Diseases of the Nose, Throat and Ear, School of Medicine of
the Royal Colleges, Edinburgh; Aural Surgeon to Leith Hospital; and

GIDEON WALKER, M.B., CH.B.,

Clinical Assistant, Ear and Throat Department, Royal Infirmary, Edinburgh.

From the Ear and Throat Department, Royal Infirmary, Edinburgh (under the
charge of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.).

IN attempting to discuss the clinical aspect of otosclerosis we are at once met with a difficulty, viz. is it possible in the present state of our knowledge to make a certain clinical diagnosis of all cases of otosclerosis during life? Lucae, for example, held that it was not possible to draw a line between otosclerosis on the one hand and chronic progressive deafness, due to adhesive processes, etc., on the other. We can, of course, eliminate patients with scars of the drum-head adherent to the ossicles or inner tympanic wall, cases of dry perforation, etc., but there remain patients with slight abnormalities of the tympanic membrane, such as opacity and loss of gloss, in which it is impossible to be certain that otosclerosis is not present.

Again, there are well-known instances reported by Siebenmann, Manasse, Bruehl, and others, in which nerve deafness was diagnosed during life, and yet on microscopic examination of the ear

¹ Read at the meeting of the British Medical Association at Aberdeen, July, 1914.

ostitis vasculosa was found to be present. Further, although some degree of atrophy of the nerve structures has been reported in most cases of advanced otosclerosis, there are other instances in which practically no degenerative changes have been found in the membranous labyrinth or auditory nerve.

There are three groups of opinion as to the pathology of otosclerosis: (1) That it is a chronic inflammatory process starting from the muco-periosteum of the middle ear; (2) that it is an hereditary developmental anomaly in the post-embryonic growth of the labyrinth capsule; and (3) that it is a trophoneurosis. I need not trouble you with other isolated views as to the connection of otosclerosis with osteomalacia, rheumatoid arthritis, disorders of the accessory thyroid glands or the sympathetic nervous system, etc. My own view at present is in favour of the first theory, *i. e.* that at least some cases of otosclerosis are due to a chronic, locally infective, inflammatory process, starting in the muco-periosteum of the middle ear in the region of the anterior margin of the oval window. The reasons for this special seat of predilection have been well stated by Bruehl, and need not be repeated.

We must not forget that the tympanic ossicles and joints are the only bones and joints in the body that are covered merely by mucous membranes. They appear, therefore, to be especially liable to infection from the surface.

I think that many of you will agree with me when I say that the middle ear often makes a better recovery from acute purulent than from catarrhal otitis media. I think it probable that catarrhal otitis may linger in the region of the oval window and in time invade the bone, and I can show specimens from two cases which go to support the view that otitis vasculosa may follow an inflammatory process in the middle ear.

At the same time we must admit that in the great majority of cases of otosclerosis hitherto microscopically examined the tympanic mucosa has been normal or almost normal.

The question of heredity—so marked in otosclerosis—may merely amount to this: In certain families the whole auditory apparatus is congenitally weak and is unable to completely throw off an attack of acute otitis media, which lingers in the muco-periosteum in the region of the oval window and in time invades the bone.

For the purpose of this paper, 153 cases—clinically regarded as otosclerosis—have been analysed by Dr. Gideon Walker and

myself (J. S. F.). Of these, 21 occurred in my private practice and 132 were obtained from the Ear and Throat Department of the Royal Infirmary by the kindness of Dr. Logan Turner.

In the great majority of cases the tympanic membranes were entirely normal, but in 26 cases there were slight abnormalities of the drum-head such as opacity and loss of polish.

Sex.—Out of 153 patients, 99 were females (64 per cent.) and 54 were males (36 per cent.).

Age of Onset.—(Recorded in only 116 out of 153 cases). Under 20 years, 26 cases; from 20 to 30 years, 52 cases; over 30 years, 38 cases.

Suggestions as to Causation.—A definite history of family deafness was obtained in 39 cases. Nine females stated that pregnancy had had a marked effect in making the deafness worse. Seven females attributed the deafness to anæmia. A history of rheumatism was obtained from six patients. In only six cases did the patient give a history of suppurative otitis. Unfortunately, the question of catarrhal otitis, *i. e.* attacks of earache not accompanied by otorrhœa in childhood or early adult life was not inquired into. Perhaps this is not very important, as it will be generally admitted that most children have had attacks of earache at one time or other.

Symptoms.—*Deafness* was present more or less in all cases.

Tinnitus was a marked symptom in the great majority.

Giddiness was mentioned in 39 cases—present in 20 and absent in 19; these figures are, of course, fallacious, as only the patients with giddiness would mention the presence of this symptom, while in the others its absence would not be noticed unless the question were inquired into.

Pain.—Slight pain of a neuralgic character was mentioned by eight patients.

Before leaving the question of symptomatology I should like to say something about the *facies* of patients suffering from otosclerosis. I have been struck by the somewhat *mask-like countenance* of these patients—their expressionless appearance. This may, of course, merely be due to their deafness and consequent loss of interest in their surroundings, but I have not noticed the appearance to the same extent in patients suffering from severe deafness due to chronic purulent otitis media and its results. The weakening of nerve influence mentioned by Froeschels and others may possibly have something to do with this loss of expression.

Examination of the Patients: External Meatus.—A special note

with regard to this was made in only 26 cases. In 14 the meatus was wide and free from wax, while in 12 wax was present. These numbers are, of course, too small to justify any conclusion.

Tickling Sensation.—This is dealt with later, and I would merely mention here that since Froeschels noted this symptom (loss of sensibility for tickling in otosclerosis) other observers have found it in deaf-mutes and in cases of the chronic adhesive process, so that its value as a diagnostic sign is not very great. It probably points to weakness of the nerve supply of the meatus derived from the trigeminal and vagus.

Tympanic Membrane.—The condition of the drumhead was recorded in 138 cases. In 112 it was normal, and in 15 of these the congestion of the promontory was seen through the transparent drumhead—the so-called “flamingo” tinge. In 26 cases there was slight abnormality of the tympanic membrane—opacity or loss of gloss.

Eustachian Tubes.—The condition of the tubes was noted in 117 cases. In 105 the tubes were patent, while in 12 there appeared to be slight obstruction. In no case was any improvement in hearing obtained after inflation. It is usually stated that in otosclerosis the Eustachian tubes are abnormally patent, but I do not know that many otologists are in the habit of catheterising normal middle ears in order to become acquainted with the normal patency of the tube. I certainly have no such standard to guide me, and I very much doubt if other otologists are in a different position.

Rhinoscopy.—Noted in 88 cases. The nose was normal in 52 of these patients, while in 16 there was slight turbinal enlargement, in 12 deviation of the nasal septum, in 4 rhinitis sicca, and in 4 catarrhal rhinitis and adenoids were present.

Functional Examination: Weber's Test noted in 82 cases. Weber lateralised to the worse ear in 45; not lateralised in 27; Weber lateralised to the better ear in 10 cases (in 4 of these the patient was almost entirely deaf in the worse ear).

Schwabach's Test.—Noted in 101 cases. Schwabach's lengthened in 94, normal in 5, and shortened in only 2 cases.

Rinne's Test.—Reported on in all cases (153). Rinne negative in both ears, 137 cases; Rinne positive in one ear and negative in the other, 14 cases; Rinne positive in both ears, 2 cases.

Gelle's Test.—I have not found this test satisfactory and therefore give no statistics as to the results obtained. The test was tried in various ways—the tuning-fork being placed in the middle

line of the vertex, on the mastoid process, or again upon the Politzer bag used to raise the air pressure in the external auditory meatus. This test was applied to many normal people—medical students and others—but I found that the results were by no means uniform, *i. e.* the students by no means always stated that the sound of the tuning-fork was diminished when the air in the external meatus was compressed. Some observers hold that if the Eustachian tube is very patent Gelle's test fails, because the air in the tympanic cavity is driven through the tube when the air pressure in the meatus is raised.

Low Tones.—I regard the total loss of perception by air conduction of the C_{32} fork as the most important clinical sign of otosclerosis, and I have been struck by the fact that the great majority of cases of suppurative otitis media and of adhesive processes and dry perforations following chronic purulent otitis can hear this fork. Loss of hearing for the C_{16} fork is of little or no importance, as many normal people cannot appreciate this sound.

The results of testing the air conduction for the tuning-fork C_{16} and C_{32} were reported on in 104 cases; none of these patients were able to appreciate these tones. Hearing for C_{64} was reported on in 87 cases; this fork was heard by 24 and not heard at all by 63 patients.

Middle Tones.—These include C_{128} , C_{256} , and C_{512} . These forks were heard by 47 and *not heard* at all by air-conduction by 23 patients; total 70.

Upper Tone Limit.—Unfortunately most of the cases were tested by means of the Galton-Edelmann whistle—an unsatisfactory instrument. The upper tone limit was reported on in 84 cases and was normal in 51, almost normal in 5, and lowered in 28.

Watch by Air Conduction.—Reported in 98 cases, heard by 74, not heard by 24.

Watch by Bone Conduction.—Reported in 87 cases, heard by 60, not heard by 27.

Hearing Distance.—Noted in 87 cases. (1) Whisper heard at 3 ft. or more, 8 cases; (2) whisper at 1 or 2 ft., 42 cases; (3) marked deafness, *i. e.* hearing worse than above, 37 cases.

In order to investigate certain points, Dr. Gideon Walker requested about a hundred patients to report themselves at the Royal Infirmary, but only twenty responded. Of these, fifteen were females and five were males. In six of these patients the onset occurred under 20 years, in nine between 20 and 30, and in five between 30 and 40. In seven of the twenty cases there was a

marked family history of deafness, and in four pregnancy and menstrual troubles were assigned as the cause. In no case was there any history of suppurative otitis media.

Symptoms.—Deafness was present in all cases and tinnitus in eighteen. The patients described their “noises” as buzzing, booming, ringing, or resembling the sound of the sea or wind.

Paracusis had been noted by the patients in fifteen out of the twenty cases, but giddiness was only mentioned by three patients. Pain of a neuralgic character was present in six cases.

Examination.—In nine the external meatus was wide and free from wax, but normal in eleven cases. The sensibility of the external meatus to tickling was tested with a celluloid Eustachian bougie, and also with a fine, cotton-tipped probe. The sensibility appeared to be diminished in every case and was markedly less on the side of the worse ear. The tympanic membrane was normal in twelve cases (in two, the flamingo tinge was present), while eight patients showed slight abnormality of the drum-head. In nineteen of the cases the Eustachian tubes inflated easily, but in one case there was slight obstruction. In none of the patients was there improvement in the hearing distance after inflation. Rhinoscopic examination showed practically normal conditions in all patients.

Functional Examination.—*Schwabach's Test*: Bone conduction lengthened in nineteen cases and shortened in one.

Weber's Test: Lateralized to the worse ear in fifteen cases and not lateralized in five cases.

Rinne's Test: It was decided to ascertain the tone at which Rinne's test became positive, and to compare this with the hearing distance in each case. In *eight early cases*, in which the hearing was comparatively good, these tests gave the following results: In one case the whisper was heard at twelve feet, and Rinne became positive at C_{126} . In three cases the conversation voice was heard at twelve to eighteen feet, and Rinne became positive at C_{512} . In two cases conversation voice heard at six feet, and Rinne became positive at C_{1024} . In the two remaining cases in this group conversation voice was heard at three feet, and in one Rinne became positive at C_{1024} and in the other at C_{2048} .

In the *second group of twelve late cases*, in which the hearing was bad, three patients heard the conversation voice at from one to two feet, and in them Rinne became positive at C_{512} . In one case the conversation voice was heard at two feet, and Rinne became positive at C_{2048} . Two patients heard the raised voice at only six inches, and in these cases Rinne became positive at C_{1024} . Lastly,

six patients heard the raised voice at six inches or less, and in these Rinne only became positive at C_{2015} . We thus see that *there is a very close relationship between the degree of deafness and the tone at which Rinne's test becomes positive, i. e.*, in early cases with fairly good hearing Rinne's test only gives a negative result with the lower pitched forks, whereas in the latter cases, with bad hearing, Rinne's test is negative up to C_{2045} .

Low Tones.— C_{16} and C_{32} were not heard in any case, and C_{64} was only heard by four out of the twenty patients.

Middle Tones.— C_{128} was heard by nineteen out of the twenty patients.

Upper Tone Limit.—This was tested with the monochord, and may therefore be regarded as accurate. In the *eight early cases* the results were as follows :

	Double vibrations per second.
1 case, whisper at 12 ft., upper tone limit . . .	16,000
1 „ C.V. 15 ft. „ „ „ . . .	15,000
2 cases, C.V. from 6 to 18 ft. „ „ „ . . .	14,000
2 „ C.V. „ 3 to 6 ft. „ „ „ . . .	13,000
2 „ C.V. about 3 ft. „ „ „ . . .	11,000

In the twelve late cases the results were as follows :

	Double vibrations per second.
4 cases C. V. at 1 to 2 ft., upper tone limit from	12,000–14,000
4 „ C. V. at 6 to 12 in., „ „ „	10,000–11,000
4 „ C. V. at 3 to 6 in., „ „ „	8000–9000

On the whole the results of these tests were much the same as those obtained by Rinne's test, *i. e.* early cases with comparatively good hearing had an upper tone limit approaching the normal (18,000 D.V.S.), while late cases with bad hearing had a greatly reduced upper tone limit, and in four of these the highest tone appreciated by the patient was only from 8000 to 9000 D.V.S. According to Zwaardemacker, the upper tone limit in early cases of otosclerosis is raised to 20,000 D.V.S., but we have not met with one of these.

Vestibular Apparatus.—The caloric reaction time was examined by syringing the ears with water at the room temperature. By the method we employ at the Royal Infirmary, Edinburgh, the average time in normal people is about twenty-five seconds till the rotatory and horizontal nystagmus to the non-syringed side begins to appear. In the eight early cases of otosclerosis, the average time was exactly twenty-five seconds, but in the twelve late cases the average time

was only nineteen seconds. These numbers are probably too small to draw any certain conclusion, but they appear to point to a certain amount of hyper-sensibility of the vestibular apparatus in the late stages of otosclerosis, or at least to an alteration in the labyrinthine fluid favouring the production of vestibular nystagmus.

THE TREATMENT OF OTOSCLEROSIS.¹

By G. J. JENKINS, M.B., C.M.EDIN., F.R.C.S.ENG.,
Assistant Aural Surgeon, King's College Hospital, etc.

THE difficulties in the way of a satisfactory treatment of otosclerosis must be great until the problems of the pathology of the condition have been solved. Otologists have for many years, in spite of or because of this ignorance of the pathology, been trying various remedies for the alleviation of the symptoms of the disease.

When first recognised as a clinical entity otosclerosis was regarded as a middle-ear affection, and treatment was largely directed to the middle-ear tract.

At this period the treatment was various—inflation of the tympanic cavity with air, hot and cold, oxygen and medicated atmospheres, and the administration of drugs supposed to influence chronic inflammatory processes. Repeated blistering of the mastoid region and even the complete post-aural operation were tried.

As treatment after treatment failed, others were thought of and tried with indifferent results.

Later it was found that certain bone changes occur in the region of the foramen ovale, and that the condition was, therefore, not purely of the middle ear.

Many, believing these changes resultant on a middle-ear inflammation, continued to treat otosclerosis as before by local and general medication that might be expected to influence a local inflammatory condition.

The known tendency to the fixation of the stapes led to a thorough trial of massage, galvanism, ionisation, fibrolysin, etc. It has been the endeavour of some to influence these local changes by means of radium and X-rays.

Since then there has been a further advance in our knowledge of the pathology. It has been found that the bone changes in otosclerosis may be found in isolated patches at some distance from the foramen ovale, indeed in any part of the bony otitic capsule.

¹ Read at the meeting of the British Medical Association at Aberdeen, July, 1914.

At the International Congress of Medicine, 1913, I ventured to state, and I still believe, that clinical and experimental evidence tend to prove that there must be a change in the labyrinthine fluid.

We now understand that in considering treatment we have to deal with an affection of a region that includes the greater part of the terminal auditory apparatus.

In natural sequence to this belief we find that trial treatment has become of a more general nature. Siebenmann gives phosphorus, Dinker also phosphorus; many give potassium iodide, Brühl thyroid gland; Ferreri a diplococcal serum, and so on.

It is suggested that pituitary, ovarian and testicular extracts and other gland extracts should be tried.

The subject of internal secretions is so complicated, however, that we must go ahead but very slowly. We cannot explain the pigmentation of the nipple at pregnancy, no more can we begin to explain the relationship of otosclerosis to pregnancy.

I have, personally, tried most of the above suggested treatments and cannot say that I have found one that has been of the least value. Phosphorus seems to do good in some cases, but I am very doubtful that there is any real benefit.

I am convinced that certain so-called treatments are harmful in some cases. I believe that massage and treatments by sounds, musical or otherwise, do harm in true otosclerosis, more especially if internal ear deafness is a decided clinical feature.

So far I have dealt with treatment in so far as it is directed toward cure or the delaying of the progress of the disease.

Can anything be done for advanced cases? Knowing that fixation of the stapes is so often present, you can understand that otologists would be likely to try to produce a new oval window. This has been done by plucking out the stapes and by making a new window in the promontory. The results of these operative procedures have been bad. Usually the patient has been worse in hearing after the operation.

Thinking that the labyrinthine fluid might be at fault I tried to alter the physics of this fluid by opening the perilymphatic space of the external semi-circular canal. The immediate result was astonishing. The hearing improved very considerably, but in two or three months the condition of the patient was almost as bad as before. Bárány did a similar operation on the posterior canal on a different deduction and obtained a similar result.

All operative procedures have been unsatisfactory and are likely to be so.

It is my experience, and it seems to be that of most, that we cannot effect any improvement in true otosclerosis by any known means. We may improve an associated condition that may be present; and we must be careful not to mistake this as an improvement in the otosclerosis.

Prophylactic treatment must be considered from the standpoint of heredity and the influence of pregnancy on the progress of the disease.

THE GENERAL MANAGEMENT AND TREATMENT.

In my opinion the patient should be told the nature of his deafness, and we should be careful not to raise hope of improvement by operation in the nose, inflation of the ear, etc. These operative procedures should not be made unless there is danger of Eustachian deafness being added.

The patient is usually pleased to hear that progress is commonly very slow, that the condition may remain stationary at any period, and that the great majority of cases do not become "stone deaf."

I advise my patients to avoid noisy surroundings. There is no doubt that noises, especially high pitched, increases the symptoms in otosclerosis.

Two intelligent doctors, who have otosclerosis, have influenced me very much in coming to this conclusion. They insist they are much worse after being in London for a time. They are conscious that a noise makes the hearing and the tinnitus worse. They are certain that after a few days in quietness they are better. One of these men attempted a study of X-rays work, and he was convinced that the cracking noise of the apparatus did him harm.

These observations lead one to study the effect of noise on other patients, and the conclusion I came to was that noise—especially machinery noise—has a marked damaging effect in otosclerosis.

This conclusion suggested to me the idea of giving the ear as near as possible absolute quietness and rest by means of a clay, fibre or other plugs in the external auditory meatus. It is, however, difficult to persuade a patient to submit to a prolonged treatment of this kind.

Therefore I strongly advise, more especially in the early stages, that, if possible, these patients should live in quiet surroundings.

Nervous exhaustion and extreme cold have a bad effect.

Diet seems to have no effect one way or the other. I am not satisfied that alcohol or tobacco have a marked influence on the disease, except in so far that when used in excess they tend to

cause a general deterioration. On this subject I should like to have the opinion of the meeting.

It would be well to warn patients against the trying of advertised remedies as aids to hearing. Some of them, I believe, do harm. The patient should, whether better or worse, see an aural surgeon from time to time, and also should see a competent man if there is an obvious increase in deafness at any time, as this may be due to the addition of another form of deafness that might be relieved.

It is in such conditions that the irregular practitioners sometimes gain a client and a nucleus of practice, as most of these men have sufficient knowledge to be able to recognise the additional deafness that can be relieved. It is for this reason I would advise the above course rather than to send the patient away out of reach and often into the hands of an irregular practitioner.

INSTRUMENTAL AIDS.

In the early stages when the deafness is slight the patient is better without instrumental aid.

If the deafness has reached such a degree that the patient cannot hear a speaker in a hall but can still carry on an ordinary conversation, the use of a "trumpet" in one of its many forms may give considerable assistance and pleasure.

When the hearing power is diminished so much that the patient can hear ordinary conversation only two or three feet, instrumental aid may be of great value. Many by the time this stage is reached can manage ordinary conversation with the aid of lip reading, but most patients welcome some form of instrumental aid. Electrical instruments are sometimes of great value at this stage, but the instrument must be carefully selected. Many derive the greatest assistance from well-fitting "auricles." This instrument is, of course, most suitable for females, as it can be so readily hidden. I am inclined to think we are rather neglecting the "auricle" since electrical instruments have been so much advocated. Indeed, I believe that the auricle properly made in many cases gives much better results than the electrical instrument, even when the latter is definitely of some help. The electrical instrument is less helpful when there is marked internal-ear deafness, whereas the "auricle" is more generally useful.

When the hearing is very much diminished so that only raised conversational voice close to the pinna can be heard, most assistance is obtained by means of the "trumpet"-shaped instruments and the speaking tube.

AUDITORY RE-EDUCATION.¹

By F. F. MUECKE, M.B., B.S., F.R.C.S.,

Aural Surgeon, Maida Vale Hospital for Epilepsy; Assistant Surgeon, London Throat Hospital; Aural Registrar, London Hospital.

Summary of Cases Treated.—Cases treated, 36; cured, 1; definite improvement, 3; improved, but relapsed after treatment, 10; *In statu quo*, 22.

This result is altogether at variance with the published results of the various inventors of re-educators. I have worked with two of these machines, been associated with a third, and closely read the inventor's description of two more. These five comprise all the best known instruments, and although they differ in details, yet to my honest belief their actions and results upon the auditory apparatus are identical in kind.

The instruments are extremely complicated to the observer, and it is wonderful what can be done with them from an electrical and physical point of view.

The main objectives aimed at are :

(a) The production of sound vibration from 80 to 3500 per second.

(b) Control of the intensity of the sound according to the susceptibility of the patient.

(c) Regularity in the emission of the sound wave.

(d) Regulation of the waves to each ear separately.

(e) Vibration of the drum by the sound waves and transmitted vibration by the air-cushion in the meatus.

In all the instruments the sound waves are conveyed by a telephone receiver which is placed firmly against the ear, and the intensity of the sound is gradually increased until the patient experiences a distinct "tickling" sensation. This intensity can readily be maintained and the tone altered at will. The limit thus obtained must not be passed, as actual pain and giddiness are thereby caused. Each sitting lasts from three to five minutes. If after fourteen consecutive sittings no improvement is found, the case is not proceeded with further.

The actual effect on the ear is chiefly threefold :

(a) Vibration of the tympanic membrane, both physiologically

¹ Read at the meeting of the British Medical Association at Aberdeen, July, 1914.

by the sound waves and mechanically by the air-cushion. The "tickling" is the conscious effect of the vibration.

(b) Vaso-dilatation of the vessels of the meatus, membrane, and middle ear.

(c) Stimulation of the nerve-endings in the labyrinth by the loud sounds.

It now remains to be seen how the deaf ear can be helped by these means. For the sake of convenience the causes of deafness may be placed under five main headings (naturally leaving out those actually suppurating):

(1) Old suppurative otitis with no membrane or a large perforation.

(2) Old suppurative otitis with adhesions and scars.

(3) Otosclerosis.

(4) Chronic otitis media catarrhalis.

(5) The various forms of nerve deafness.

To commence with the first of these divisions, it is obvious that the only way in which such cases can be benefited would be by the last of the means mentioned above, namely, the stimulation of the labyrinth. But it is rare to find any diminution in the bone-conduction in these cases, so the labyrinth is probably not at fault. Therefore one would not expect any benefit from the re-educators in these cases. And this was found to be the case in the eight patients who came under this heading.

Secondly, practically the same might be said of the next division, as it is extremely hard to imagine that drum-vibration or vaso-dilatation could have any effect on the old scars and fibrous adhesions. Practically I found these cases equally unsatisfactory.

Thirdly, even more improbable of help should this division be, for here we are dealing with bony ankylosis of the stapes to the edges of the foramen ovalis. However, certainly some of these patients were temporarily helped as regards tinnitus.

Fourthly, we come to by far the largest group—the chronic catarrhal type, with indrawn drums, some hypertrophic and some atrophic. It is in this group where the possibilities, if any, of the re-educators are mainly centred. The effect of the drum massage and vaso-dilatation is certainly beneficial, as every aurist has long ago noticed with the pneumo-massage machines; but we must grant to the re-educators a physiological massage which may be of greater benefit. In the early chronic stages of this disease I obtained some improvement either in the hearing or the tinnitus in almost every case, but no more improvement than that which

I could obtain in the same case with the Eustachian catheter and pneumo-massage, in fact, the latter method—as might be expected—gave the better results. Unfortunately I got the relapse which aurists are so familiar with in other forms of treatment. I continued the treatment, giving three or four separate courses, all with the same result. The effect on tinnitus was, on the whole, more satisfactory than on the hearing. In the later stages of this trouble some of the patients had immediate benefit, which I could not equally get with the catheter and pneumo-massage. I put this down to the stimulation of the labyrinth, which from want of function had become sluggish. It is well known in the late stages of chronic otitis media that bone-conduction is lessened and the wakening up of the nerve-endings may account for the improvement. Unfortunately again the relapse came after treatment had stopped.

The thinking practitioner will not be at all surprised at these results, for the treatment can in no way affect the cause, which remaining, quickly reduces the auditory apparatus to its previous condition.

In two of the cases, both of whom had been under several courses of treatment at the hand of one of these inventors, but had relapsed after, I removed the cause of the trouble. Afterwards one of these had the re-educator only and the other the re-educator plus catheter, the latter doing the better. Both are certainly improved, but I think this was more due to the operation than the after-treatment, and it is interesting to note that neither has relapsed, as they did after the inventor's treatment only.

I did not try the re-educator on any of these cases in their earliest or sub-acute stage, as we already know such cases to be readily cured by older and well-tried methods. Probably it is this form of case which swells the numbers of "successful" cases in the published re-education lists. But if the cause be left the deafness will undoubtedly return.

Now to come to the fifth group, namely, nerve deafness. My list shows that here I have no success at all—even despite the combination with active and anti-syphilitic treatment. This is only in keeping with the results obtained in the treatment of affections of the other nerves of special sense. I believe that when there is any actual disease or affection of the labyrinth the re-educators are quite useless.

The main beneficial effect of the machine I believe to be the vibration effect. The word "re-educator" goes for nothing. In

one of the cases which showed temporary improvement I endeavoured to prove this by keeping the receiver firmly against the ear and controlling the intensity to a marked "tickling" sensation. I kept to this for three days and carefully noted the result. The next three days I had the receiver held slightly further from the ear and increased the intensity of the sound to well above the previous. Now, though the vibration was not felt as the added air-cushion vibration was absent, no result was found, the patient herself asking to be put back on the old method. I found a similar result in the other three cases on which I tried this method.

It will be noticed that I have one cured case. He was thought to be a case of neurasthenic deafness, and I quite concurred in the diagnosis. He was an exceedingly rapid cure and has remained so.

I have had no experience in voice-listening lessons, which the educators claim to be a useful adjunct to their method, but I fail to see why it should not be equally useful in any other method.

Three cases have so far (a year to sixteen months) not relapsed. One (a relapse of the inventor's) refers to tinnitus only. The second had a removal of marked nasal obstruction, and the third, certainly highly successful at the time, I have lately not been able to trace.

So I regret to state that the result of my experience with re-education has not been satisfactory. I state with emphasis that no patient should attempt this treatment until a reputable aurist has either ordered it or found further orthodox treatment useless—for although the treatment can do no direct harm, it may do indirect harm by postponing the removal of the cause of the deafness.

These cases were all done at the London Hospital. Mr. Hunter Tod, the Aural Surgeon at the Hospital, saw the patients before and after, and can verify my results. Quite a number came from Mr. Tod's private practice, so I had excellent material to work upon.

[For tables, see next page.]

No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
1-8	15 to 30	Cases of chronic-otitis media (suppurative). Now dried up. All without drums or with large perforation	14; 1 a day consecutive	Only speech. W. and Wh. <i>nil</i>	Unchanged	Unchanged	No reaction whatever. All could easily stand the full strength. Naturally no "tingling" sensation.
9 H. T.—	M., 23	Nerve deafness during secondary syphilis. Onset fairly sudden. "606" given	30; 2 periods	Loud voice only	Slight variations during treatment. Result <i>nil</i>	Not present	Most unsatisfactory both from "606" and re-education point of view.
10 Q. K.—	F., 25	Nerve deafness. Congenital syphilis. Three years' deafness, sudden onset. "606" 2 months ago	35; 2 periods	Wh. 5 in. Left <i>nil</i> . Rinne + both	Extraordinary variations from good hearing to stone deaf. <i>In statu quo</i>	Unchanged. Said that the noises increased after treatment for 10 hours <i>Nil</i>	Unsatisfactory. Some days almost expected cure. This variation may have been due to "606." Patient ceased because gave up in disappointment. Ceased to come as no improvement.
11	M., 32	Old specific. Nerve deafness. Deaf 5 years. Specific treatment 12 years ago	14	Loud voice only	Unchanged	<i>Nil</i>	Treatment quite useless. Sent to lip-reading school.
12	F., 12	Nerve deafness. Sudden deafness following shock aged four (whilst bathing). Stone deaf. Conscious of vibrations only	20; 2 periods	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	Was hopeful during treatment, as patient thought that the traffic in the street was more audible. The end was most disappointing.
13 G.—	M., 25	Nerve deafness. Deafness following measles when aged four. Some hearing returned when aged fourteen. Loud low-pitched sounds only	45 visits; 4 periods	Shout only. Occasionally distinguished words	<i>Nil</i>	<i>Nil</i>	Unsatisfactory.
14 K.—	F., 20	Nerve deafness following scarlet fever 14 years ago. Lip reads	20	Loud voice close to ear	<i>Nil</i>	<i>Nil</i>	No result. Sent to lip-reading school.
15	M., 12	Sudden onset of deafness 3 months ago. Conscious of vibration only. No response to any labyrinthine tests	14	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	

No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
16	F., 12	Nerve deafness, 3 years following measles. Stone deaf. Labyrinthine reactions present	14	<i>Nil</i>	<i>Nil</i>	<i>Nil</i>	No result. Sent to lip-reading school.
17	M., 50	Chronic otitis media. Slight nerve deafness, left ear. Right ear affected since childhood, left 10 years	45; 3 periods	Right ear <i>nil</i> . Left, W. 3 in.; Wh. 1½ ft.	W. 3 in.; Wh. 3 ft.	Unchanged	Improvement during treatment. Found that he could do without his hand to his ear. Relapsed after 1½ months. Another treatment and again relapsed to former state.
18	M., 18	Chronic suppurative otitis media, drums healed. Right ear deaf 12 years, left ear deaf 2 years. Large scar on right side.	20	W., left 6 in.; right <i>nil</i> . Wh., left 6 ft.; right 4 in.	W., left 8 in.; right contact. Wh., left 14 ft.; right 6 in.	<i>Nil</i>	Great improvement. Retained office billet and could again hear through telephone. Ceased coming without notice. Unable to trace him.
19	F., 49	Left ear — discharge and deafness since childhood, dried up 3 years ago; drum scarred and adhe- rent to tympanic wall. Right ear — chronic otitis media 1 year, gradually getting worse, retracted drum. Rinne just + in right ear	14	Left shout only. Right, W., 5 in.; Wh., 15 ft.	<i>In statu quo</i>	Unchanged	Patient greatly dissatisfied.
20	M., 45	Chronic otitis media both 18 years. Drum retracted and greatly thickened. Calcareous deposit	20	Low voice close to ear	<i>In statu quo</i>	Unchanged	No improvement.
21	M., 28	Chronic otitis media 25 years. Several treatments with inventor	30	W. and Wh. <i>nil</i> . Voice 1 ft. both	Voice 3 ft.	Better	Relapsed in 14 days, just as he had during other treatments
22	M., 36	Chronic otitis media 22 years left, 12 years right. Great noises—almost me- lancolic because of the noises	14	Left, W. and Wh. <i>nil</i> . Right, W. <i>nil</i> , Wh. 2 in. V.: L., 1 ft.; R., 10 ft.	<i>Nil</i>	No relief to great noises	After submucous resection of the septum there was definite im- provement in both noises and hearing, and I am going to re- start him at the instrument

No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
23 B—	F., 36	Deafness 18 years, mostly right. Noises bad. Paracusis Willisii. "Otosclerosis" diagnosed by several specialists. Several treatments with inventor. Submucous resection done with good result to nasal catarrh and noises	20	Right, W. nil. Left, W. 2 in.; Wh. 2 ft.	<i>In statu quo</i>	Much better	This case is still undergoing treatment. What little good was done to hearing and noises relapsed almost immediately treatment stopped. After submucous resection for grossly deviated septum the patient quickly felt great improvement in general health, noticing mostly the feeling of clearness in her head and relief from the noises. This first treatment of re-education has improved her as before, but has not relapsed in two months time. Did not return for second treatment. No difference in hearing.
24	M., 24	Chronic otitis media 6 years. Severe catarrh post-nasal	14	Wh. 1 in. both	<i>In statu quo</i>	Slight improvement	Unsatisfactory.
25	M., 25	Otosclerosis 12 years	14	W. and Wh. nil. V. 2 ft.	<i>In statu quo</i>	—	Unsatisfactory. Treated by two different kinds of education.
26 S. H—	M., 50	Chronic otitis media 25 years. Slight nerve deafness	45; 3 periods	W. and Wh. nil. V., nil right, 2 ft. left	<i>In statu quo</i>	No difference	Although no improvement found by testing, patient was insistent that he was better—could hear the street traffic from office stool after 5 years' cessation. Patient relapsed to former state.
27 S. D—	M., 52	Otosclerosis 10 years	30; 2 periods	W., left 1 in., right 2 in. Wh. left 1 yard, right 2½ yards	<i>In statu quo</i>	Less	Insistent on improvement, but unfortunately relapsed after about 1 month.
28 R—	F., 27	Chronic otitis media 8 years. Drum greatly indrawn	45; 3 periods	W. nil; Wh. contact	Wh., 3 in.	—	Most unsatisfactory.
29 F—	F., 30	Chronic otitis media 6 years. Indrawn drums	14	W., 1½ both. Wh., left 2 ft., right 1 ft.	<i>In statu quo</i>	—	

No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
30	F.,	Otosclerosis 12 years. Hears	30	V., left 1½ ft., right 2 ft.	<i>In statu quo</i>	—	Most unsatisfactory.
31	M.,	Otosclerosis 10 years; 5 years hospital treatment	30; 2 periods	W., left 1½ in., right contact.	<i>In statu quo</i>	Less	Was confident during the first days. Noises distinctly less.
32	M.,	Chronic otitis media 20 years. Indrawn drums	14	W., left contact, right <i>nil</i> . Wh., left 14, right 6 in.	<i>In statu quo</i>	—	Most unsatisfactory.
33	F.,	Chronic otitis media 15 years. Drum indrawn	25; 2 periods	V., left 3 ft., right 4 ft.	<i>In statu quo</i>	Less	Unsatisfactory though long time.
34	F.,	Chronic otitis media 5 years	14	No tests	<i>In statu quo</i>	—	Most unsatisfactory.
35	F.,	Chronic otitis media 30 years. An old case of the inventor's—hearing during previous treatment <i>in statu quo</i> , but troublesome noises quite stopped till death of husband caused them to restart	20	—	—	Less	Noises again quite stopped.
36	M.,	Deafness since aged 10 years. Several specialists could find no cause, who had been told many different things. Air conduction was normal. Bone conduction decreased. He was extremely neurotic in temperament, and I thought it a case of neurasthenic deafness	30; 3 periods	W., left <i>nil</i> , right contact. Wh. <i>nil</i> . Loud voice only. c ³ fork not heard, c ² with difficulty. Labyrinthine tests present	Normal hearing. hears c ³ fork	Quite ceased	Absolute "cure" after about fourteen treatments. Re-engaged at office. Six months later had not relapsed.

N.B.—Where not mentioned labyrinthine tests were normal in all the cases.

SOCIETIES' PROCEEDINGS.**BRITISH MEDICAL ASSOCIATION.**

Meeting at Aberdeen, July, 1914.

DR. H. LAMBERT LACK, *President, in the Chair.*

Abstract Report by MR. HAROLD WHALE.

President's Opening Address.

With regard to the work before us, the two subjects chosen for discussion will both, I believe, prove of great interest and, I trust, mark a decided advance in our progress. In both cases we are discussing affections, the treatment of which has hitherto been considered hopeless. The very fact that a subject has again come up for discussion indicates that some progress has been made, and I trust that after the meeting we shall take a more hopeful view of both affections. It is quite certain that our opinions as to the absolutely hopeless nature of inoperable neoplasms of the throat has undergone a marked change in recent years. We may not be able to cure them, but we can certainly do a great deal more than we have ever been able to do in the past.

The record of the past year has been one of marvellous progress in our branch. Three things appear to stand forth. They may have been invented before, some of us have been acquainted with and used them before, but I think it is only in the past year that they have been generally recognised and adopted.

Suspension laryngoscopy, which we owe to the genius of Killian, practically dates from the International Medical Congress of last year. It makes a tremendous advance on bronchoscopy, especially in the extraordinary facilities it allows for operation.

Diathermy, introduced by Nagelschmidt, of Berlin, and first used in this country by Douglas Harmer, is certainly more than a year old, but its value is still not so widely known as it should be. It is employed in few hospitals and by few specialists. I regard it as the most valuable means we have for dealing with many conditions. I have found it invaluable in cases of inoperable nævi in the throat and mouth, invaluable in a few intractable cases of lupus of the upper air-passages, and if any of you should meet with one of those most difficult cases of nose-bleeding due to multiple hereditary telangiectasis, I would strongly recommend you to try it. In my hands it has proved the only means of dealing with such a case where the cauterium had entirely failed.

Finally, I would like to mention the intra-tracheal administration of ether as one of the greatest helps in our work. It enables us to perform severe and bloody operations upon the upper air-passages with a feeling of complete security. It may be used for all operations on the nose, upper jaw, mouth and pharynx where serious bleeding is expected, and will, I think, completely supersede the need for laryngotomy as a preliminary to these proceedings. One may regret that none of these great advances has come through the work of our own fellow-countrymen. We must hope they will not be far behind and that something will shortly materialise from the good work which we know is being done. There is, for instance, Freeman's work of hay fever which bids fair to provide us at last with a rational and successful method of treatment for

that serious distressing disease, although we have been so often disappointed by previous efforts in this direction that one hesitates to accept anything not confirmed by prolonged experience.

Discussion on Treatment of Inoperable Growths of the Nose and Throat.¹

Dr. WATSON WILLIAMS (Bristol) had come to the conclusion that for sarcomas radium in suitable dosage often effected exceedingly good results, while in epitheliomas of the mucous tract the results, though temporarily encouraging, generally ended in recurrence and death. That sarcoma was often successfully removed by the knife was, of course, undoubted. Nevertheless it was frequently impossible to determine how deep a growth had penetrated, and he felt that patients should sometimes first have the benefit of radium or diathermy in *suitable* cases. He instanced one of his cases in whom operation on a sarcoma of the tonsils which had extended into the neck was followed by recurrence. This was treated by two applications of 200 mgrm. of radium by Dr. Finzi, and now, two years later, he found the patient remained quite cured. Finally we could not fail to realise that even if in malignant growths in the œsophagus recurrence was inevitable, the relief to the patient and prolongation of life in such inoperable conditions was a sufficient reason to resort to radium or X-rays in these cases.

Mr. SOMERVILLE HASTINGS (London) gave his experiences of the action of radium in sixteen cases, namely, five sarcoma and eleven epithelioma. Of the former, two were apparently cured, two temporarily improved, and one was unaffected. Of the epithelioma cases, four were temporarily improved, and seven were unaffected. The regions involved included pharynx, naso-pharynx, tonsil, œsophagus, and cervical region (glands). The silver tubes he used were 0.3 to 0.8 mm. thick; the dosage 50 to 200 mgrm. of radium bromide. The duration of the exposure was from four to twenty-four hours. Stress was laid upon the necessity of avoiding excessive exposure, and one case was described in which too prolonged an exposure had led to serious sloughing. In this case the patient had septic teeth, and this factor might also have played a part in inducing the complication. In œsophageal growths the radium tube could be fixed in a Symonds' tube.

Dr. PEGLER narrated a case of a female patient, aged fifty-nine, who had consulted him for a growth in the region of the lingual tonsil. The glands in the neck, on both sides, were greatly swollen; there was also an enlarged gland in the right axilla. When screened by Dr. Finzi, a dark shadow was seen in the posterior mediastinum, indicating a mass of glands in that situation. The right half of the diaphragm was paralysed. The case was treated by insertion of a tube of pure radium bromide into the tongue, and afterwards by a weekly application of X-rays. The result so far, after a period of about four months, is extremely satisfactory in regard to swallowing, speech, and general condition, and especially so is the disappearance of the tumour and of thrombosis of the right lower limb, which intervened some time after the radium operation, and which opens up an interesting question as to its immediate cause.

Dr. W. S. SYME said he thought the most important pronouncement in the discussion was that made by Dr. Hill, that the time has come when, in cases of operable malignant disease of the nose and throat, we may use our discretion as to whether we shall treat the case by surgical methods

¹ For introductory papers see JOURN. OF LARYNGOL., RHINOL., AND OTOL., October, 1914, p. 481, *et seq.*

or by radium. Early cases of sarcoma of the nose are particularly hopeful as regards surgical treatment, and it would seem inadvisable to do anything to allay removal by ordinary surgical measures. In sarcoma of the tonsil, again, it is sometimes possible to remove an early growth by simple enucleation. In regard to epithelial growths the action of radium has been shown to be so unreliable that the argument in favour of surgical measures is stronger. The time, therefore, does not appear to have arrived when it should go forth that there is any method but surgery for dealing with early malignant growths.

Dr. T. H. LIVINGSTONE (Newcastle) quoted a case of sarcoma of the maxillary antrum which he had treated with radium. The primary growth disappeared and a sinus which was present healed up. The patient died six months later of malignant disease of the liver.

Mr. T. JEFFERSON FAULDER said the effects of diathermy in these cases are often very striking as regards the freedom from pain, the abolition of fœtor, the absence of febrile reaction and sometimes delayed growth or even apparent healing. Those who have time and opportunity ought to make experiments on the recent cadaver, and microscopical examination of the tissues, as was done in the case of rodent ulcer when that disease began to be treated by X-rays. At the same time it would be a great misfortune if we allow the idea to get abroad that we can deal effectively with cancerous growths at a late stage. As things are it is very rare to see a case of cancer of the throat at what might be properly called an early stage. To attach the word inoperable to diathermy, which is a very fine kind of cautery, or to radium, about which we know very little, is, in the present state of human nature, to encourage the sufferers from cancer to procrastinate even more than they do already. Cancer of the hypo-pharynx is accessible by means of suspension laryngoscopy, and if we could get such cases at an early stage we have an ideal means of treating them in diathermy. For if its effects are so striking in the inoperable cases it must be capable of curing early cases in a more easy and safe manner than the knife, but if we use the word inoperable too freely these early cases will be conspicuous by their absence. He asked whether in cases where glands in the neck are dissected out after diathermy there was any difficulty of a special nature.

Mr. JOHN F. O'MALLEY was indebted to Mr. Somerville Hastings for the opportunity of working with him and following the progress of his cases. All the sarcomata treated did well, but carcinomata only moderately so. The latter in many instances underwent softening, especially around the margin of the growth which tended to lose its hardness and diminished in size. The possible explanation is, that the connective tissue rounded barrier, which is set up against the invading epithelial cells and which is a large factor in the hardness of the growth, attributed to infiltration of the healthy tissues, disappears before the therapeutic action of the radium. The following are the principal points which seemed to recommend the extended use of diathermy in these cases: The facility of removal of growth of any size; the facility of their removal in parts inaccessible to ordinary surgery; the freedom from hæmorrhage—hæmorrhage during removal with the knife is usually severe and difficult to control, and patients of this type bear the loss of blood badly; the wounds in mucous surfaces appear to heal well with little scarring.

The PRESIDENT said that during the past year he had treated sixteen cases of malignant disease of the throat, which had entailed over thirty applications of diathermy. His results were as follows: Four cases of carcinoma of the soft palate and adjoining regions, all extensive and

inoperable. They now appear locally free from growth although one of the worst cases was treated last August. In every case the diathermy caused swelling of the neck and glandular region, and subsequent removal of the glands was very difficult, in one it proved impossible. Probably in these cases there will be recurrence. Three cases of carcinoma of the palate, which was surgically operable, results all good. In two there was swelling in the glandular region of the neck after the diathermy. One endothelioma of post-nasal space recurred rapidly after two applications, and one carcinoma of the nose was not improved by four applications. One case of post-cricoid carcinoma covering the whole back of the cricoid ring and both arytenoids was done by the aid of suspension laryngoscopy and did remarkably well. There was no immediate ill-effects, and when suspended a month later only scar tissue could be seen. Two similar very extensive cases of carcinoma of the lower pharynx were very little benefited. Three cases of carcinoma of tongue and floor of mouth showed decided improvement, and one is probably free from growth. In two subsequent removal of glands proved very difficult; in one the glands were removed first. One inoperable epithelioma of epiglottis and adjacent ary-epiglottic fold and base of tongue did extremely well. Glandular removal soon afterwards proved remarkably difficult owing to dense fibrous infiltration of neck. Result good so far after seven months, although glands on other side of neck had to be subsequently removed. My experience would lead me to these conclusions: (1) That operations on the throat by diathermy were almost free from risk even in very extensive growths wherever situated and in very unfavourable subjects. The subsequent freedom from fever and pain are extraordinary. (2) That growths too extensive to be removed surgically may be treated with improvement and, rarely, perhaps cured. (3) That extensive diathermy operations may render subsequent removal of glands extremely difficult. It might possibly be better in some cases to remove the glands first. (4) That cases with growths in the throat, locally operable, but where, for any general cause, removal by cutting is inadvisable, diathermy offers excellent prospects of cure. I would even suggest that owing to its ease and simplicity, and the thoroughness this allows, with its freedom from risk, it was the best method of dealing with carcinoma of the throat in all cases. Also it is certain that the effects of diathermy extend much deeper than the immediate sloughing, that the underlying tissues extending right down to the glands are visibly affected, become swollen, infiltrated and subsequently fibrous and scarred. May we not hope that outlying cancer cells in these regions may be destroyed. Clinical experience, X-rays, and radium all show us that these cells are more vulnerable than those of healthy tissues. Radium has acted extremely well in three cases of post-nasal sarcoma and one nasal carcinoma. Both radium and X-rays have failed in every case of carcinoma of the throat.

Dr. WM. HILL, in reply, said he had quite expected that he would be severely handled for his pronouncement that he not only agreed with those who hesitated to accept the rigid rule that all malignant tumours should be submitted to an immediate cutting operation, provided the growth was within the limits of operability (in the sense that a thorough radical extirpation could be carried out), but went further and definitely laid it down that in some growths which are operable, *e.g.*, sarcoma, not only was it permissible to try methods other than the knife first, but that the method of choice should be the application of radium before even thinking of surgery in sarcomas. Dr. Syme was alarmed lest the public should be

lulled to false security, and to refuse operation in the first instance, that thus valuable time would be lost, and a more extensive operation would eventually be required. It was necessary again to emphasise the point that sarcomas, if they do react to radium (as is usually the case), react almost at once, so that there is no delay of any moment. As regards carcinomas, in advocating diathermy, as permissible in the first instance, in radically removable growths, as well as in those incapable of being completely extirpated, he was in agreement with Mr. Harmer, but it was incorrect to say we were advocating non-surgical measures, for electro-diathermic coagulation of the primary growth in the throat was a surgical measure pure and simple, as the electrode accomplished surgical eradication instead of the knife, but with less chance of lymphatic dissemination and of transplantation, and with more rapid healing of the wound. When there were invaded glands the practice hitherto had been to resort to the knife for dealing with them, but he agreed with Mr. Faulder that there might perhaps be an advantage in combining the knife with diathermy in dealing even with the secondary masses in the neck. Whilst radium might be used in combination with diathermy in carcinomas in the throat, in the gullet we had hitherto practically been restricted to radium in all forms of malignant disease. The President had mentioned the unfortunate occurrence of fibrous contraction following diathermy in the post-epiglottic pharynx, but the same thing was liable to follow, not only radium, but the use of the knife, and was a complication which could often be dealt with by timely intubation. He (Dr. Hill) found that unless a style was used to fix the radium apparatus in the gullet, the radium tube might shift, as had happened in one of his cases from post-anæsthetic vomiting. He therefore did not recommend the use of radium in a Symonds' funnel.

Mr. HARMER replied. His advice was to perform diathermy whenever possible for primary malignant growths; in other words, to operate on the case and so remove as much of the disease as possible. If this advice is followed there will be a great many more operable cases. Later on radium or X-rays can be employed to check the recurrence. As regards operable malignant disease, it is possible that diathermy will prove at least as valuable as the knife. The importance of asepsis cannot be overstated. In answer to Dr. Watson Williams, he believed that any vessel can be coagulated, whatever its size, but the danger of secondary hæmorrhage when the sloughs separate must always be considered. He did not think that the glands were more difficult to remove after treatment by diathermy unless there had been inflammation of the neck.

Discussion on Otosclerosis.

For introductory papers see p. 513 *et seq.* of this issue.

Dr. MACKENZIE BOOTH read a communication by Dr. A. Maurice, of Paris, on "Diathermy with Auditory Re-education." He described an apparatus for the transmission of heat to the depths of the ear—and claimed that the combination of the diathermy with the use of the kinosiphone gave better results than by the latter method alone. Dr. Booth had used Dr. Maurice's kinosiphone for five months with manifest improvement in hearing as well as in the relief of a tinnitus and other discomforts attending the deafness. He regretted that such short time had elapsed so that no definite statement as to permanence could be made. He submitted graphs of three cases in which considerable improvement in the hearing power was indicated by an ascending curve.

Dr. WATSON WILLIAMS felt particularly interested in the slides

shown by Dr. Fraser which lend support to the view that otosclerotic lesions might be infective in pathogeny. So much pointed towards a local infective influence determining the changes associated with otosclerosis. He felt that the absence of gross catarrhal conditions did not suffice to exclude catarrhal infection as a determining cause. One finds that frequently optic neuritis or atrophy is determined by posterior ethmoidal cell or sphenoidal sinusitis which is quite latent in that it was not associated with pus-formation. But it was probably just these cases where polynuclears were absent that toxic influences played a more potent influence, and so too, perhaps, we had analogous processes occurring in the ear, and these might, to some extent, explain an absence of gross evidence of middle-ear catarrh in otosclerosis.

Dr. WILLIAM HILL remarked that in spite of the laborious pathological and clinical observations carried out by those who had so ably opened this discussion no marked positive advance appeared to have been made either in our conception of the essential nature of this obscure disease or of its relief. Mr. Muecke had rendered a great service, not only to the profession, but also to that section of the general public who were not obsessed with a leaning towards quackery.

Dr. W. S. SYME had never seen clinically anything to make him look upon otosclerosis as an inflammatory process. He asked Dr. Fraser what was the proportion of cases of otosclerosis to all other cases of ear disease seen at the Edinburgh Royal Infirmary. He would also like to know the proportion of cases to the general population, and whether people of the better class are more frequently affected than those of the lower. Moreover, in his experience it is unusual to find otosclerosis pure and simple and unaccompanied by adhesions and catarrhal changes in the membrane and middle ear, not that he considered this anything but an accidental association. In regard to treatment one feels that surgery alone holds out any hope. The difficulty in the past in making an opening in the horizontal canal has been that this has quickly become closed. It has appeared to him that this might be prevented by implanting a strip of periosteum into the opening.

Dr. JOHN W. MACKENZIE (Inverness) referred to Mr. Muecke's paper on "Auditory Re-education," and mentioned one of his cases of nerve deafness with a certain amount of Eustachian catarrh, treated by Mr. Cathcart, London. Improvement for about three months resulted and then relapse in spite of constant use by a miniature kinosiphone.

Mr. JENKINS agreed with Dr. Gray as to the aetiology of otosclerosis. Though he admitted the possibility of inflammatory processes playing a part in causation of otosclerosis, yet he saw no evidence of this either clinically or pathologically. He would like again to draw attention to the evidence of there being changes in the labyrinthine fluid in this condition. The giant-cells he had described at a meeting of the Otological Section of the Royal Society of Medicine early this year were very large cells with definite outline and with many smaller irregularly arranged. These cells differed from all other giant-cells he had seen in any other pathological condition. (Mr. Jenkins exhibited specimens of these giant-cells under the microscope.) He thanked Dr. Fraser for his introductory paper and was very pleased he had mentioned tuning-fork tests once again. At the International Congress, 1913, Mr. Jenkins had drawn attention to the difference between the Rinne test in otosclerosis and middle-ear deafness. His further observations had convinced him that these observations were correct, and that in the majority of cases the Rinne test was negative with much higher forms in otosclerosis than

with obstructive deafness with similar degree of deafness. In many cases he found a negative Rinne in otosclerosis with the highest forks of Edelmann series, even when the hearing of conversational voice was good at 24 feet. He regarded the raising of the low-tone limit as a sign of obstructive deafness element appearing. The internal-ear deafness was a variable element. He would like to object to describing a certain progressive internal-ear deafness as otosclerosis. These cases of almost pure internal-ear deafness clinically behaved certainly very like otosclerosis in many ways, but he would like pathological evidence before classifying them as otosclerosis as is being done on the continent. He would rather that such cases be described as progressive internal-ear deafness in the meantime.

Discussion on Dr. Watson Williams' Paper (Intra-nasal Operative Treatment of Frontal Sinus Suppuration).¹

Dr. WILLIAM HILL showed Good's bone file or rasp for enlarging the frontal ostium by the per-nasal route. Two of its four sides were serrated and two were smooth; these two adjacent smooth surfaces prevented fracture of the lacrymal bone externally and of the dangerous area posteriorly. He suggested that the term "bougie" was hardly an appropriate one for Dr. Watson Williams' metal sounds. He had recently employed the largest size after a per-nasal enlargement of the infundibulum with ease and benefit.

Sir W. MILLIGAN said that in the hands of Dr. Watson Williams the method of intra-nasal operation was no doubt an excellent and satisfactory one, but in the hands of those less expert he had his doubts as to whether it was as safe a procedure as the external operation, even allowing for its well known dangers. He would be interested to hear what were the relative results of intra-nasal and extra-nasal surgery upon the frontal sinuses in his hands, also if after intra-nasal operations there were many recurrences. From the fact that by the intra-nasal route the frontal sinuses were not obliterated he would be inclined to think that recurrences must of necessity be fairly numerous.

PROCEEDINGS OF THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.

Meeting in the Western Infirmary, Glasgow, June 6, 1914.

DR. WALKER DOWNIE *in the Chair.*

(Continued from p. 475.)

Two cases of Plaut-Vincent Infection of External and Middle Ear.—James Adam.—(1) Boy, aged six; seen January 6, 1914. History prior to July, 1913, cannot be obtained. Both ears must have been suppurating before that date, and have been continuously since. On both sides a foul blood-stained discharge, with erosion of meatus and adjacent parts of concha; the external canals plugged with bleeding granulations; the parts very tender. One small gland felt behind left

¹ See JOURN. OF LARYNGOL., RHINOL. AND OTOL., May, 1914, p. 225.

sterno-mastoid. Dr. Burton, Assistant Pathologist to Glasgow Royal Infirmary, reported: "Swab from throat shows no organism in films; in culture, one colony of *Staphylococcus albus* developed; swab from ear shows in films fusiform segmented bacilli and spirochætes in profuse growth, also Gram-positive cocci. These alone grew on culture, and are atypical, not conforming to streptococcus or staphylococcus class." Many remedies were tried, including salvarsan locally; the best results were got from painting eroded surfaces with 5 per cent. silver nitrate in sp. æth. nit. cleansing, instillation of tr. iodi., and, latterly and especially, with ethyl violet and brilliant green, in 0.1 per cent. watery solution. With three months treatment the granulations cleared up; discharge stopped, or almost so; ossicles and most of membrana tympani gone. Hearing for whisper: right, 8 ft.; left, 12 ft.

(2) Child of twenty-two months has had double antral suppuration for ten months, and nasal catarrh for twenty; no history of throat affection; similar appearances to preceding case when first seen, April 29; still much granulation and discharge; glands enlarged on left of neck. Bacteriology (April 29): Spirochætes, segmented fusiform bacilli, pneumococci. May 6: Spirochætes, pneumococci, no fusiform bacilli. May 22: Pneumococci alone. No Vincent bacilli from naso-pharynx. This child's twin brother has had catarrhal rhinitis and suppuration from right ear for twelve months; no erosion of meatus; no sore throat: membrana tympani thickened and inflamed; no granulations.

Dr. J. S. FRASER asked if the suggestion was that the spirochætes, etc., were the cause, or only a second infection.

Dr. ADAM was of opinion that they were primary.

Sudden Non-syphilitic Deafness in Young Children.—J. Kerr Love.—J. M. G., aged seven. About two years ago had whooping cough, and in connection with this illness lost the hearing of one ear, the right. Dr. Albert Gray was consulted about this time, and diagnosed nerve deafness of the right side. The boy continued in good health till October, 1913, when suddenly, and without any other symptom of illness, he became deaf at school, and within two days he had no hearing in either ear. Dr. Fullerton removed adenoids and enlarged tonsils, but no improvement took place. He had no hearing for speech or shouting, but heard the tuning fork on the mastoid process and by air-conduction. Rinne negative. Bone-conduction much diminished. He lip-reads fairly well, but speech is beginning to suffer. In her only other pregnancy, which occurred before this boy was born, the mother aborted at six weeks. The tympanic membranes are normal. The Eustachian tubes are open. There is no mouth-breathing. The bloods of the father, mother, and child each give a negative Wassermann reaction.

Since this case reporter has seen another similar case. He was anxious to have an expression of opinion on those cases. Mr. Arnold Jones had recorded cases of "hysterical" deafness in children in which the clinical symptoms are much the same. These cases were clearly not syphilitic. He wished to urge everyone when they did come across such cases not to let the patients drift into mutism. Both these children were now recovering their speech by being taught lip-reading. He was most interested in the pathology. The lesion was probably labyrinthine or central.

Dr. GRAY said that several years ago the case came under his observation in private. He at that time thought that nothing could be done for it; he did not see the child again. There were no labyrinthine symptoms.

Temporo-sphenoidal Abscess following Cholesteatoma of Antrum; Radical Operation; Subsequent Onset of Pressure Symptoms; Operation for Abscess; Recovery.—J. Kerr Love.—Female, aged fifty-five, admitted April 28, 1913, to Glasgow Royal Infirmary. Suppuration commenced in right ear six years ago after a cold. Patient has suffered also from tinnitus and vertigo for four years. There is a large perforation showing cholesteatomatous material protruding. Hearing test: Whispered speech in right ear, 6 in.; in left ear, 20 ft. April 30: Cholesteatoma cleared out. Tegmen antri eroded. Flake of bone adherent to dura over tegmen. Facial nerve exposed by erosion and irritated by swabbing. Partial facial paralysis. May 2: Facial paralysis recovered. May 20: Temperature, 100.8°F . May 21: Temperature, 101°F .; pulse, 112. Post-auricular flap laid forward. Tegmen covered with granulations. Flake of bone still adherent and apparently healthy. Drainage apparently good. Discharge slight. May 29: Patient delirious and very restless. Movement of arms irregular and purposeless. May 30: Temperature, 99.4°F .; pulse, 100. Left side paralysed. Clonic twitching right arm and leg. Retention of urine. Unable to speak although conscious. Neck not stiff. Pupils: Right larger than left; both active. No rigors. Nystagmus impossible to ascertain. Temporo-sphenoidal abscess drained through tegmen, dura being freely opened. June 1: Temperature, 103.8°F . in afternoon; pulse, 108. Catheter still required. Neck stiff. Vomited for first time. Paralysis still complete. June 2: Bone opening enlarged and thickened band of dura slit up. Larger tube inserted. June 3: Movements returning to left leg. Recognised friends. Speech returned. Neck stiffness passing off. June 9: Temperature normal since June 5. Subsequent history is that of uninterrupted progress towards health.

Sinus Thrombosis following Middle-ear Suppuration; Operation on Sinus; Jugular Vein tied; Recovery.—J. Kerr Love.—Female, aged twenty-two, was admitted to the Glasgow Royal Infirmary on December 23, 1913, with complaint of severe left-sided headache, pain in the ear, and mastoid tenderness on the same side, and discharge from the left ear of some three weeks' duration. On admission, temperature was 99.8°F .; respirations, 28; pulse, 116. The temperature rose during the night to 104.4°F .; respirations, 34; pulse, 110. The following day (the 24th) the radical mastoid operation was performed. The mastoid process was large and pneumatic. The suppurative process seemed of older date than the time given, and pus was everywhere present. The sinus was exposed and found to be partially thrombosed, but the thrombus broke down under manipulation, and the cavity was then packed. The jugular was ligatured in the neck, but was not washed through. The dressing was left for two days, and when changed on the 26th the wound was healthy, no pus showing. The wound in the neck for ligaturing the jugular was also healthy, and was sealed with collodion. Four days later (the 30th) pus appeared in the sinus on dressing, and there was some discharge from the neck wound. The sinus was syringed gently with warm boracic solution, and the lower stitches of the neck wound removed to permit of drainage. Thereafter healing proceeded favourably for about fourteen days, and the neck wound was again stitched up in its lower part on January 13. On the 6th, however, there had been a sudden rise of temperature to 103°F . and the patient complained of considerable pain over the left trochanter. This, however, passed off in about thirty-six hours, and the temperature came down to

normal. On the 14th, the day after the neck wound was stitched, there was much discharge of a sero-sanguineous nature from the upper part of the wound, and this became frankly purulent the following day. The upper and lower stitches were again removed, and light packing was inserted. Thereafter healing was satisfactory, the upper and lower parts being allowed to granulate. The post-auricular wound had also been allowed to granulate, and was looking healthy. On February 27, when dismissed, the neck wound was healed over, and there was a small opening in the post-auricular wound. Subsequently the external auditory canal contracted, so that a further operation on the soft parts was found to be necessary. Now the canal is of normal width.

Dr. SYME said that the wound where the jugular is tied should not be immediately closed.

Dr. KERR LOVE explained that he had to syringe from the sinus to the neck and the wound had got septic, therefore he had to close it later. The case would have done better had the wound been left open. His rule was to tie the jugular first in all cases.

Abstracts.

NOSE.

Paget, Owen.—The Nose as a Safeguard against Disease. "Australasian Medical Gazette," April 18, 1914.

Paget regards the nose not only as a mechanical filter, and therefore a safeguard against dust, but also as a safeguard to the body against microbic invasion. The suggested method by which such action arises is that the nose draws in noxious bacteria; by destroying them and absorbing the toxins produced it raises the opsonic index of the body. The paper is too long and discursive to abstract the observations on which the theory is grounded. The foundation of this theory on these observations is not convincing.

A. J. Brady.

Beebe, S. P., Ph.D., M.D. (New York).—The Relation of Pathologic Conditions in the Nose and Throat to the Origin and Treatment of Hyperthyroidism. "Journal of the American Medical Association," August 29, 1914.

Many observers have noted clinically the relation of thyroid disease to previous infections, and the writer of this paper has gone a step further in locating these infections in the nose and throat. According to Dr. Beebe, from 35 to 40 per cent. of patients suffering from hyperthyroidism between the ages of sixteen and twenty-four give a history of repeated attacks of acute tonsillitis, and many of them have a chronic pharyngitis and rhinitis with enlarged tonsils and adenoids, but not infrequently one or more of the accessory sinuses is infected, and it is by no means rare to find that a rapid enlargement of the thyroid, with characteristic symptoms of over-activity, has followed immediately after a particularly severe tonsillar infection. Such patients bear these infections badly, and every effort should be made to prevent them. When the patient's general condition will permit the tonsils should be enucleated, and the adenoids removed. The relief which follows the elimination of infection, whether in the sinuses, the naso-pharynx or

tonsil, is usually so prompt and effective that one has little doubt as to its causal relation to the over active thyroid, and it becomes at times more important to attend to the infected areas than to attempt direct action on the thyroid.

In conclusion, the author advises the careful examination of the nose and throat of every young patient with an enlarged thyroid, and also the investigation of the thyroid in every nose and throat case, as hyperthyroidism can be checked in such patients before any serious damage is done if the beginning is recognised.

Birkett (Rogers).

NASO-PHARYNX AND ACCESSORY SINUSES.

Kelsey, A. L., and Brown, J. M.—Malignant Tumours of the Nasopharynx, with Report of Cases. "Annals of Otology, etc.," vol. xxii, p. 1147.

Offers the following classification of naso-pharyngeal malignant tumours: Carcinoma (glandular and squamous). Sarcoma (round-, spindle-, giant-, and mixed-celled; fibro-sarcoma, osteo-sarcoma, chondrosarcoma, myosarcoma). Endothelioma (lymphangio-endothelioma, hæmangio-endothelioma). Relative frequency from available reported cases is: Carcinoma, 30 per cent.; sarcoma, 60 per cent.; endothelioma, 10 per cent. Four cases are described.

Macleod Yearsley.

Myles, R. J.—The Surgical Management of Diseases of the Frontal Sinus. "Annals of Otology, etc.," xxii, p. 807.

Advocates the following: (1) When the acute cases have unbearable, severe, and continuous pain in the sinus and above the eyes, attended with profound constitutional symptoms—fever, chills, and depression—we should proceed in a definite manner to relieve the pressure, if necessary by doing a submucous resection on an obstructive deflected septum and by removal of the anterior end of the middle turbinal, a part of the anterior ethmoidal cells, and the nasal process of the superior maxillary bone; and, if this fails, should make a small incision in the skin above the inner canthus and a small opening in the bone—a radical operation to follow a few weeks later if necessary. (2) Chronic cases should be treated by the external operation where there is evidence of bone necrosis, either with or without perforation; for neoplasm, especially of malignant nature; for meningeal symptoms which are probably due to sinus disease; for continued attacks of severe pain and discharge mixed with pus and decaying *débris*; and to satisfy patients who demand relief from recurring attacks of frontal sinusitis after failure to obtain relief by the internal operation. The Killian operation, combined with removal of the anterior ethmoidal cells and nasal process of the superior maxilla, has proved to be most satisfactory.

Macleod Yearsley.

LARYNX.

Thomson, Sir StClair.—Three Years' Sanatorium Experience of Laryngeal Tuberculosis. "Brit. Med. Journ.," April 11, 1914.

The author, in an interesting paper, draws the following guarded conclusions:

(1) Even in the selected cases sent to the sanatorium the larynx was involved in 25.6 per cent.

(2) A considerable number of cases (102 out of 795) are sent to a sanatorium without their showing active tuberculosis.

(3) In middle-class patients the sex proportion is nearly equal (females 28.3 per cent., males 24.0 per cent.).

(4) Laryngeal tuberculosis occurs much more frequently (13.7 per cent.) in early favourable cases than is generally recognised.

(5) In more decided cases this proportion is doubled (27.1 per cent.) and in advanced cases trebled (40.8 per cent.).

(6) The complication markedly decreases the expectation of life among consumptives.

(7) It deserves more regard than it has hitherto commanded as a factor in prognosis.

(8) It may not infrequently be present without complaint or voice change. Hence :

(9) The larynx should be carefully inspected in every case of pulmonary tuberculosis.

(10) Improvement in lung and larynx frequently, but not necessarily, progresses *pari passu*.

(11) In certain cases larynx improves and lung retrogrades. The converse is rare.

(12) Arrest of laryngeal tuberculosis can be effected in a sanatorium in 20.7 per cent. of all cases.

(13) Limited and slight laryngeal lesions may become arrested spontaneously with sanatorium treatment.

(14) The galvano-cautery is the best weapon for local treatment. Indicated in 20.22 per cent. of 178 cases, it completed cures in 41.60 per cent. of cases in which it was used.

(15) Satisfactory results have not been secured by any methods outside a sanatorium.

(16) Sanatorium treatment is at present the first and most valuable method for arresting laryngeal tuberculosis.

(17) Local measures are much more promising under sanatorium conditions.

(18) At present, in many cases, diagnosis is too long delayed, or the patient sent to a sanatorium too late. Hence :

(19) Early diagnosis and prompt sanatorium treatment is urged.

Macleod Yearsley.

E.A.R.

Lake, Richard.—Remarks on the So-called Re-education of the Deaf.

“The Lancet,” vol. clxxxv, p. 1449.

The author has found re-education of the deaf almost useless in acquired deafness of adults. It is most useful in congenital deafness, even should this be total, and it is also of value in acquired deafness of childhood, when this is not due to any destructive lesion of the internal ear.

Macleod Yearsley.

Kreidl, Alois.—A Note on the Subsidiary Acoustic Tracts. “Monats. f. Ohrenh.,” Year 48, No. 1.

Although a good deal is known as to the route and connections of the cochlear nerves with the nuclei and cortical centres of the contralateral side, no certain experimental evidence has been furnished, according to the author, that connections with the homolateral side existed. This question has occupied his attention for some years past, and he has lately had the

opportunity of investigating it incidentally whilst carrying out research work on the respiratory centres.

It was necessary in these experiments—dogs were used—to split the medulla lengthways, and after their recovery it was possible to test the hearing. When the animals had been killed at varying intervals sections stained by Marchi's method afforded other histological data. The following is an abstract of the writer's conclusions:

In spite of this lesion, experimentally performed, the sensation of hearing undoubtedly remained. According to this, therefore, it is possible to state that this perception is unaffected by the median severance of both the ventral and dorsal portions of the decussation of the acoustic tracts.

Similar experiments were undertaken on apes, with a like result.

The author suggests that all that this investigation demonstrates is the functional connections of the acoustic paths on the homolateral side, but does not dispute their association with the opposite side; the proportional destination of hearing impulses under normal conditions is a matter that must be left for future further investigation.

Alex. R. Tweedie.

REVIEWS.

Text-Book of Local Anæsthesia for Students and Practitioners. By Prof. Dr. GEORG HIRSCHHEL, Heidelberg, with an Introductory Preface by Prof. Dr. WILMS. Translated by RONALD E. S. KROHN, M.D. Lond. London: John Bale, Sons and Danielsson, Ltd., 1914.

This small, but well-turned-out book gives a fairly compendious and accurate account of the methods of inducing local anæsthesia in the various regions of the body, and to the English-speaking general surgeon ought to prove of great value, particularly in view of the methodical progress which local anæsthesia seems to be making on the Continent. The author tells us, for example, that in the Heidelberg Surgical Clinic, during 1906, 85 per cent. of the operations were performed under general anæsthesia, and 11·4 per cent. under local. In 1911 the numbers respectively were 52 per cent. and 42 per cent.

To the oto-laryngologist, however, we fear the book will prove to be rather disappointing, since the amount of space devoted to the operations on the throat, nose, and ear is necessarily very limited, and the various surgical procedures are rather too summarily handled.

The translator, in his preface, warns us that he has (unfortunately, we think) adopted the new Basel anatomical nomenclature, but surely even that terminological revolution has not substituted the term "internal ear" for middle ear (p. 74).

Dan McKenzie.

BOOKS RECEIVED.

Disease of the Nose, Throat and Ear. By William Lincoln Ballenger, M.D. Price 28s. net. London: Henry Kimpton, and Glasgow, 1914.

Lehrbuch der Osophagoskopie. By Prof. Dr. Hugo Starck. Price 8 mks. and 9 mks. Würzburg: Curt Kabitzsch, 1914.

Die Syphilis der Unschuldigen. By Prof. Dr. P. H. Gerber. Price 50 pfg. Würzburg: Curt Kabitzsch, 1914.

Pharmacopœia of the Hospital for Diseases of the Throat. Edited by Charles A. Parker and T. Jefferson Faulder. Price 2s. 6d. net. London: J. and A. Churchill, 1914.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY, AND OTOTOLOGY.

Original Articles are accepted on the condition that they have not previously been published elsewhere.

Twenty-five reprints are allowed each author. If more are required it is requested that this be stated when the article is first forwarded to this Journal. Such extra reprints will be charged to the author.

Editorial Communications are to be addressed to "Editor of JOURNAL OF LARYNGOLOGY, care of Messrs. Adlard and Son, Bartholomew Close, E.C."

**ON THE MINIMIZING OF HÆMORRHAGE IN EXTIRPATION
OF THE TONSILS AND ON THE EMPLOYMENT OF THE
HÆMOSTATIC GUILLOTINE.¹**

BY WM. HILL, M.D.,

Surgeon for Diseases of the Throat, Nose, and Ear, St. Mary's Hospital,
London; President, Section of Laryngology, Royal Society of
Medicine; and

G. J. F. ELPHICK, M.D.,

Senior Clinical Assistant, Throat, Nose, and Ear Department,
St. Mary's Hospital.

[Abridged.]

WE must first of all make a short digression in order to define terms. The extirpation of a tonsil by whatever method, whether by dissection, by the guillotine, by the snare, by the finger, or by punches, etc., may be either *partial* or *total*. The latter, when the whole tonsil, including the parenchyma and the capsule, is removed entire in one mass, like a nut, is known as *enucleation*. Some laryngologists and general surgeons use the term *enucleation* as synonymous with total removal of a tonsil, even if it is extirpated in two or more portions, but such nomenclature is not strictly accurate. An *enucleation* was doubtless sometimes effected by the finger method alluded to by Celsus. It was often, however, a very sanguinary operation, in spite of assertions to the contrary, and

¹ Read at the meeting of the British Medical Association, Aberdeen, July, 1914.

was usually followed by much pain and inflammatory reaction. The guillotine operations of the last century, like the dissecting operations with vulsellum and scalpel or scissors, were for the most part incomplete or partial extirpations. The *normal partial* operation which was the one usually aimed at consisted of the reduction of the enlarged tonsil to about its normal size, so that the part left behind did not project beyond the pillars. A more partial operation which from want of skill leaves a good deal of tonsillar tissue projecting beyond the level of the pillars, may be designated an *insufficient partial* operation. Between what we have called the normal partial extirpation and total removal (whether the latter is *en masse*, i. e. enucleation, or in two or more portions) there is an intermediate operation which may be designated *subtotal*—that is, very nearly total extirpation—in which almost all the parenchyma is removed, but the embedded part of the capsule lining the tonsillar bed is left behind.

On account of occasional recurrence of the enlargement, more especially in children, when the partial operation merely reduced the tonsil to more or less normal dimensions, total excision—and preferably in the form of enucleation—is now aimed at by many experts. The subtotal operation, called in America Myles' operation, is, however, held by some to be the ideal operation. There is usually less inflammatory reaction than after total removal, and the preserved capsular lining to the tonsillar bed prevents exposure of the peritonsillar lymphatics, and tends to reduce the chances of local septic infection. While, however, a total extirpation requires more skill in its successful performance than a "normal partial" one, the subtotal operation is extremely difficult to carry out with regularity and precision either with the guillotine alone or with the snare, and portions of parenchyma left behind have often to be punched out to complete the operation; the authors have in the past used Kretschmann's punch for this latter purpose. The tendency at the present day in this country and in America, however, is to aim at total extirpation, whatever instrumental method is employed. Partial reduction to the normal size, however, appears to be still popular on the Continent and has some advocates here and even in the United States. A leading American authority on the tonsils, Makuen, has recently re-affirmed his preference for either subtotal or partial removal on the ground that total removal of the capsule as well as the parenchyma leads to deformity of the fauces and vocal deterioration, and is unjustified in singers especially. Those who usually aim at total extirpation

in the general run of cases are agreed that the partial operation is preferable in professional singers.

Curiously enough discussions on the relative merits of "normal partial," of subtotal, and of total extirpations respectively of the faucial tonsils have usually taken place under the inappropriate heading of "*Tonsillotomy versus Tonsillectomy*." These terms are by no means synonymous or even suggestive of partial excisions on the one hand, and total on the other. The term tonsillotomy may be rightly applied to the operation of slitting up a chronically septic crypt or making an incision to facilitate the extraction of a calculus of the gland. The parallel term, gastrotomy, suggests an incision into the stomach, but not either a total or a partial gastrectomy. No one would understand by thyroidectomy a total excision of the thyroid gland, as such an operation is contra-indicated. It must be obvious that the term tonsillectomy implies equally either a partial or a total extirpation of the tonsil by means of a cutting operation and not necessarily with the guillotine; and that the term cannot very appropriately be applied to total extirpations with the finger or with the snare.

On account of the old form of guillotine operation proving inadequate in many cases for the complete removal of tonsils, a return to the method of completely dissecting out the tonsil with vulsellum and scalpel or dissector was strongly advocated early in this century by Waugh, Hey Groves and other general surgeons in this country, in order to reduce the number of recurrent cases amongst children operated on in the out-patient department of hospitals. The same more thorough, though sanguinary, procedure became prevalent about the same time in the United States, though there blunt dissectors and special scissors were often used either with or without the aid of the knife.

The operation described so accurately by Waugh was an improvement on the old scalpel operation, as the pillars were carefully dissected so as to expose the capsule, which was freed from the bed of the tonsil by means of the finger, with or without the further assistance of the knife, snare, or guillotine.

The employment of the snare as an adjunct to the dissecting operation was much used in the United States, and this led to the revival of the snare operation, either alone in suitable cases, or in conjunction with dissection in broad-based adherent and buried cases for the enucleation of tonsils. Tilley and Waggett, among British laryngologists, have, in the past at all events, been warm advocates of the use of the snare. The snare usually employed

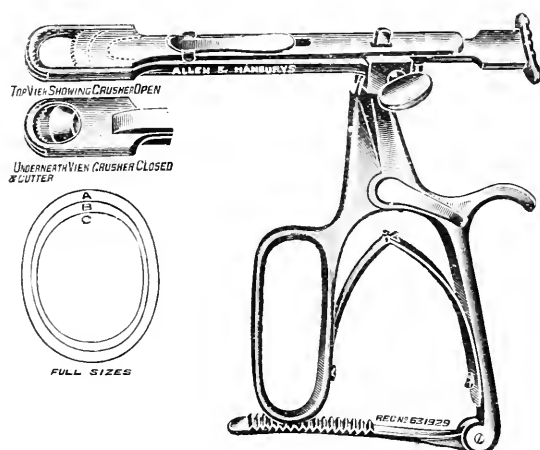
both here and in America is a different instrument from that employed by Lennox Browne and was the invention of an American surgeon, Eve. The instrument is a straight one, and the loop is of No. 8 piano wire, and the tonsil in suitable cases can, in practised hands, be enucleated and detached by hand-traction only. This operation, with snare alone, is usually a much less hæmorrhagic one than the ordinary sharp guillotine operation, and of course very much less so than when any considerable dissection is resorted to. The disadvantages of the snare and vulsellum method are that it is more difficult to carry out than the guillotine operation, requiring, as it does, considerable experience, added to natural expertness; and, on account of the pliability of the loop, it is not always possible to do a clean enucleation without preliminary dissection, which latter considerably reduces its hæmostatic value. Leslie Davis, of Philadelphia, who performs enucleation by means of dissection combined with the snare, actually advocates *routine ligation* of a group of vessels in the upper part of the eviscerated tonsillar bed by passing a silk suture on a curved needle by means of a special needle holder underneath this vascular bunch and then tying the suture. Most operators, however, only resort to ligature when serious bleeding ensues, and it is unlikely that its adoption as a routine precautionary measure will find much favour.

During the last three or four years many of those who formerly relied on (1) dissection, either alone or combined with the guillotine or snare, or on (2) the snare with or without preliminary dissection, have come back to the pure guillotine method. The recently developed guillotine operation is, however, a very different one from the old sharp-bladed method, in which enucleation could only be effected with certainty in a moiety of favourable cases.

In order to contrast the new and the old method of operating with the Physick type of guillotine, it is necessary for us to make another digression, and again for the purpose of defining terms, in order to facilitate lucidity of description. All modifications of Physick's guillotine present for examination two main portions, viz. a haft and a shaft. The haft or handle in Mackenzie's, Heath's, Kelson's, Jones' and other guillotines is a more or less plain straight bar, which is attached more or less at right angles to the shaft by a screw arrangement. In Ballenger's model the handle is more complicated and serves the additional purpose of driving home by lever action the knife blade, which is pushed home by the thumb in the older pattern. The *shaft* of a guillotine is made up of a steel *bed* for the sliding *blade*, which latter has a crescent-

tic sharp cutting edge distally. The hole, or *fenestra*, at the distal end of the shaft is usually loosely alluded to as the "ring" of the guillotine. The accessory arrangements for keeping the sliding blade in its bed differ in the various designs. It is incorrect to speak of the composite shaft as the *blade* of the guillotine.

If the guillotine be held with its handle vertical and shaft horizontal, the latter will present two flat horizontal surfaces, one looking downwards, *i. e.* handlewards, and the other upwards, or ob-handlewards. It will save a good deal of confusion if we speak of these two surfaces of the shaft as the handleward and ob-handleward surfaces respectively, rather than as upper and lower, or inner and



The Elphick hæmostatic guillotine.

outer, as is usually done. The modern type of shaft differs from the Physick type in that the former is strengthened or reinforced by being made of much thicker steel, so that it cannot bend when used as a lever, as presently to be described. Sluder's reinforced shaft, fitted to a Ballenger handle, may be taken as embodying the most recent improvements in guillotine construction. The edge of the blade, however, instead of being as sharp as possible, as in the older guillotine method, is used either dulled or actually blunt.

It may appear superfluous for us to contrast in detail the technique of the old with more modern methods of extirpation with the Physick type of guillotine, but the necessity will be obvious later. When the old operation was performed, for example, on the *left* tonsil, with the patient in the upright position, the shaft was inserted flat along the surface of the tongue, the handle being vertical, the distal extremity of the shaft was then depressed, so

that the lower pole of the tonsil could be somewhat engaged in the fenestra, the shaft was then rotated through 90° , so that the handle projected horizontally to the left from the corresponding angle of the mouth; the handleward surface of the shaft thus looked laterally to the left, and was distally in contact with the left faucial surface, and proximally was against the left corner of the mouth, the whole of the shaft being in the sagittal plane; by digital pressure inwards and upwards from the outside at the angle of the jaw aided by outward pressure of the guillotine, as much of the tonsil as possible was forced through the somewhat undersized fenestra, and the blade was then driven home. If the blade was very sharp, either the whole or a greater or less portion of the tonsil was detached from the fauces and either hung by a few threads of the tissue at the end of the shaft or else fell off into the buccal cavity or into the pharynx; by a scoop-like action of the guillotine, the tonsil, when completely detached, was retrieved, aided perhaps by the finger; in some cases it was swallowed. When the edge of the blade was blunt, the instrument was often "held" in the fauces and had to be detached either by traction or the use of the finger or both combined.

For very many years, however, a modification of this old procedure has been practised; after more or less of the tonsil was engaged in the hole of the guillotine, the proximal end of the shaft was moved from the left angle of the mouth horizontally across towards the opposite angle, so that the direction of the axis of the shaft, instead of passing sagittally backwards as in the early method, occupied a more diagonal position directed through the buccal cavity. At the same time the shaft was rotated somewhat, through its long axis, so that its handleward surface looked slightly upwards and forwards to the left. In addition, the distal end of the shaft was drawn slightly forwards, dragging the tonsil (which is loosely attached to its bed) and displacing the posterior pillar slightly forwards and upwards and bulging the anterior pillar forwards, inwards and upwards; the blade was then driven home either by the thumb of the hand grasping the handle, or by that of the other hand. It should be stated that the advantage of using a blade with not too keen an edge, or even a blunt one, was pointed out in a discussion at the London meeting of the Association in 1910. By this means experts succeeded in a large proportion of cases—in children especially—in effecting either a total extirpation (enucleation) or else a subtotal one. It is curious that, though this modification has been practised for many years by some experts, none of

the modern text-books, so far as we are aware, lay any stress on it, with one exception. StClair Thomson not only describes it, but gives an explanatory diagrammatic illustration of the manœuvre; he appears, however, to make use of traction with a vulsellum as an adjunct in some cases. This operation was performed either with Mackenzie's or Heath's, or some other modification of the Physick type of guillotine.

Within the last four or five years the technique of enucleation with the guillotine has been further modified and undoubtedly improved by Whillis in this country, who wrote in collaboration with Pybus, and by Sluder in America. The two methods are often assumed to be identical, but the description of each which follows will, we feel confident, show that this assumption cannot be maintained. Whillis and Pybus can claim priority of announcement—January, 1910, against June, 1910. Both methods are based broadly on the later technique we have just dealt with above, as performed with the old guillotine, which improved method, as we have pointed out, was so clearly described and illustrated by StClair Thomson.

First as to the form of guillotine used. Whillis, in Newcastle, and Sluder, in America, independently decided that it was necessary to strengthen considerably the shaft of the guillotine in order that, when this was used to forcibly lever the tonsil upwards and forwards from its normal bed, the shaft should not bend and so impede the action of the sliding blade, as was sometimes experienced with the old type of instrument. Moreover Whillis, like Sluder, independently arrived at the conclusion that in dealing with the tonsil (and we will here again consider the *left* tonsil) it was of advantage to apply the ob-handleward surface of the shaft to the faucial region and not the handleward surface, as in the modified old operation; and necessarily the handle of the instrument, instead of projecting towards the left and forwards, pointed towards the *right shoulder*, the proximal end of the shaft pressing backwards the right angle of the mouth; and the direction of the long axis of the shaft thus more nearly approached to a transverse rather than a diagonal line through the buccal cavity. Sluder, after threading as much as possible of the tonsil, commencing at the lower pole through the fenestra of the guillotine, then levered the tonsil and the attached posterior pillar upwards and forwards, so that the semicircular distal border of the shaft abutted against the dental eminence on the inner surface of the mandible, corresponding to the position of the fangs of the last molar tooth; with

this eminence as a *point d'appui* the dull or blunted blade was driven home, passing behind the anterior pillar over the deep surface of the capsule, without cutting it, towards the posterior pillar; which latter the previous manœuvre had displaced as far as its tonsillar attachment was concerned, forwards and outwards, so as to lie almost in the same coronal plane as the anterior pillar, though of course considerably external to it. The resistance of the anterior pillar associated with this forward, upward and rotatory displacement of the gland caused most of the tonsil to pass through the fenestra, and the pressure of the advancing dulled edge blade compressed the whole gland through the fenestra; the tonsil was therefore entirely dislocated out of its bed with which it was connected merely by a compressed stump. This latter is necessarily composed of the circumferential reflection of mucosa, connecting the equatorial area of the tonsil (at the junction of its embedded and non-embedded portions) together with some areolar tissue and vessels of the tonsillar bed. The method is difficult and not always successful as regards enucleation.

The manœuvre as described by Whillis and Pybus is somewhat similar, but not by any means identical with that of Sluder; they make no effort to bring the end of the shaft of the guillotine against the dental eminence, which is an essential part of Sluder's method, as originally described by him; on the contrary they lever the tonsil and posterior pillar forwards and upwards to a position far removed from and above the dental eminence of Sluder, producing a marked bulging of the anterior pillar of the fauces somewhat high up, and before driving home the dull-edged blade they insinuate the whole of the tonsil through the fenestra of the guillotine by means of digital coaxing, combined with firm compression on the anterior pillar. This manipulation with the finger or thumb is an essential original feature in the technique of Whillis and Pybus.

It seems to us clear that the operation now usually performed in this country and rather frequently designated "Sluder's method," should really be described as that of Whillis and Pybus, or shortly "Whillis' method," as Whillis we have reason to conclude was actually responsible for the improved technique subsequently so clearly described and illustrated by him and his collaborator Pybus. Although we prefer the technique of Whillis as the easier and more certain as an enucleating procedure, yet from the point of view of hæmorrhage there is little to choose between the two

methods. They both possess the disadvantage attaching to the use of a blade with an edge which is not keen, viz. that the crushed stump cannot easily be severed without considerable pressure, and that forcible traction or else *torsion* has at times to be resorted to, which means tearing through the stump at a level deeper than its crushed portion, thus leading in some cases to considerable bleeding. Sluder has recognised this disadvantage and endeavours to crush right through the stump by an added mechanical arrangement, exerting much additional pressure at the proximal end of the blade. O'Malley, who has made several modifications in the Ballenger-Sluder instrument, has endeavoured to facilitate the crushing through and severance of the stump by ingeniously filling up the usual slot of the ring with lead into which the dulled edge of the blade sinks. He uses a blade the edge of which is only slightly dulled and considerably sharper than that employed by many operators, and he claims to carry out thorough enucleation and easy severance of the stump without necessitating straight traction, but rather indirect traction, but by means of a half turn torsion following Whillis, and he further claims with the loss of only two or three drachms of blood.

It is important to bear in mind the fact that up to the time of the driving home of the dull blade, the modern guillotine method of enucleation of the tonsil is a hæmostatic one. If the guillotine remains held after driving the blade well home the stump has to be torn through deep to the crushed portion, and the operation is apt to be converted into a very sanguinary one. A single blade obviously cannot perform the two functions of crushing and cutting; if too sharp it is apt to cut through the capsule and embedded part of the parenchyma in a certain number of cases, and if blunt it crushes the stump without severing it, and then either traction or torsion must be employed; in either case there may result considerable, and at times severe, hæmorrhage.

No doubt the idea of incorporating a blunt crushing blade as well as a sharp cutting blade lying side by side in the same shaft of the guillotine has occurred to some others, but when this was designed by one of us in November of last year, neither of us was aware that any such suggestion had ever been made by anyone previously.

As will be seen by referring to the illustration, the Elphick Hæmostatic Guillotine is in general construction on the lines of the Ballenger-Sluder instrument. The blunt-edged crushing blade is situated on the surface of the shaft which looks away from the

handle, the ob-handleward one, and is driven home as in the Ballenger instrument by handle action. There is, however, an added catch arrangement to retain the crushing blade hard against the stump for so long as may be deemed expedient. The crescentic edge of the blunt crushing blade is either smooth or else serrated; our preference is for the latter. The sharp cutting blade is placed in a plane nearer the handle than the crushing blade, but parallel to it, and is driven home by the disengaged hand; it resembles the blade of the Physick type of instrument in shape and mode of action. The instrument is manipulated according to the Whillis method as far as the stage of manipulating and then everting the tonsil by digital pressure well through the hole of the guillotine; the crushing blade is then driven home, and the tonsil is now isolated and connected with its bed only by the narrow stump (crescentic on section) which lies crushed between the opposing surfaces of the crushing blade and the distal rim of the fenestra. The shaft of the guillotine is now made to assume a more sagittal direction, and the tonsil is seized with a vulsellum; the cutting blade is then driven home and the entire gland, including its inverted capsule, detached. The stump, however, is still clamped by the crushing blade.

Up to this stage there is either no hæmorrhage at all or else a mere trace of blood in the faucial region. As the normal coagulation time of the blood is about five minutes, the instrument is allowed to remain at rest in this position attached to the fauces for five or six minutes, if practically perfect hæmostasis is desired. The catch holding the crushing blade in contact with the compressed stump is then, after a suitable delay, released and the instrument withdrawn. The bleeding from the bed from which the tonsil has been enucleated is so slight as to amount almost to a mere smear of blood. The remaining tonsil is dealt with in the same way. To avoid the prolongation of the time during which the anæsthetic has to be administered, the second tonsil can be dealt with by another guillotine, whilst the first guillotine still clamps the stump, provided the mouth and buccal cavity is sufficiently large to permit of the necessary manipulations with the second instrument in spite of the presence of the first one.

In the case of hæmophilics the coagulation time should be ascertained and, if possible, reduced by the administration of horse serum, calcium lactate, etc., and if the coagulation time is reduced from say fifteen minutes to eight minutes, it is obvious that the tonsillar stumps must be each compressed for nine or ten minutes.

To make sure not only that there shall be no primary bleeding, but as a safeguard against secondary hæmorrhage, the stump can be ligatured distally to the crushed portion before releasing the clamp by a silk thread passed round the stump between the end of the shaft and the tonsillar bed. This effectually prevents the gaping of the stump which otherwise occurs on unclamping.

It will be evident that this hæmostatic enucleation manoeuvre is rather a protracted method, and can only be carried out under somewhat prolonged general anæsthesia; it is, therefore, only indicated in cases of hæmophilia and in debilitated anæmic subjects in whom even a moderate loss of blood is of some moment. For the ordinary run of hospital cases in which guillotine enucleation is performed under short anæsthesia, in either the upright or the supine position, it is neither possible nor usually necessary to make any pause between the cutting off of the tonsil and unclamping the stump; but we can assert that the amount of bleeding from the bed of the tonsil is comparatively trifling in the majority of cases operated on rapidly compared with the average amount after the employment of present day patterns of one-bladed guillotines. In private practice where more prolonged anæsthesia by chloroform or by a mixture is adopted, our practice is to clamp each stump for one or two minutes, unless there are special indications for the more protracted compression—and the amount of bleeding is usually insignificant. We practise ourselves and, therefore, advocate in all cases the routine use of this type of guillotine which detaches the tonsil without disturbing the crushed stump and considerably reduces the average amount of blood lost, and which is in accordance with hæmostatic procedures carried out elsewhere by general surgeons.

The arrest of bleeding immediately following the removal of enlargement of Luschka's tonsil ("adenoids") can easily be carried out if specially indicated, by packing the post-nasal space with a firm moored pad of cotton-wool or of lint, or of gauze wrung out of boric acid lotion inserted by the aid of adenoid forceps and pressed well home with the finger. Hitherto, however, there has usually been a considerable amount of blood lost after removal of the tonsils and in some exceptional cases the bleeding has continued for so long as to necessitate the resort to exceptional measures such as long-continued pressure or the use of special forceps with one blade in the fauces and the other outside against the angle of the jaw, or sewing up the pillars with or without the adjunct of a roll of lint, or the use of Michel's clips, or the ligature

of separate bleeding points, and even tying the carotid, etc. All these procedures are a source of embarrassment to the surgeon and to the patient, whether done for primary or for secondary hæmorrhage, and in restless children already weakened by loss of blood the further administration of an anæsthetic becomes a necessary evil. Our object, therefore, should be to reduce the chances of such contingencies to a minimum, and hence the importance of the method we adopt and now for the first time brought to the notice of practitioners by us. The advantages of this instrument have been proved by many months' employment by ourselves and by our colleagues in the Throat Department of St. Mary's Hospital.

Quite recently one of us came across in the January number of *The Laryngoscope* for the current year, an article by Dr. La Force, of Iowa, entitled "La Force Hæmostat Tonsillectome." The instrument is of the Ballenger-Sluder type and is not only provided with both a crushing and a cutting blade (thus anticipating in principle the instrument we have employed), but also had as a component part an ingenious ligature-carrier by which the stump can be ligatured in three sections. This would effectually prevent the gaping of the stump which invariably follows unless ligaturing is resorted to; and is an improvement on the single thick silk ligature previously suggested by us in this article. The instrument is a complicated one, as is also the technique of its employment when ligaturing is carried out, but it is obviously theoretically the most efficient hæmostatic guillotine as yet devised; though the number of cases in which the tedious process of tying the stump in sections is indicated is necessarily small.

We have also ascertained that Mr. Howarth has recently made use of a Ballenger-Sluder type of guillotine with a dull-edged blade and a sharp-edged blade combined in one shaft.

[NOTE.—Dr. Hill wishes it to be understood that though he has borne a considerably larger share than his collaborator in the compilation of this article, yet any credit which may be considered due for the independent inception and details of construction of the hæmostatic guillotine here illustrated belongs entirely to Dr. Elphick.]

DIFFICULTIES AND DANGERS OF EXPLORATORY PUNCTURE OF THE ANTRUM OF HIGHMORE.¹

By A. BROWN KELLY, M.D., D.Sc.,

Surgeon for Diseases of the Nose and Throat, Victoria Infirmary, Glasgow.

EXPLORATORY puncture followed by perflation and irrigation is the most reliable method of diagnosing antral suppuration and is, therefore, in daily use in rhinological clinics.

¹ Read at the meeting of the British Medical Association, Aberdeen, July, 1914.

The test is generally regarded as perfectly simple and safe, so that when, several years ago, I had some disquieting experiences in carrying it out, I considered them to be unique. That they are by no means so has been proved by subsequently published reports of somewhat similar cases. The subject has not been written upon or discussed, so far as I know, in this country, and in Austria and Germany, where it has begun to attract attention, no satisfactory explanation has been forthcoming. I, therefore, venture to bring it under the notice of British rhinologists, in the hope of eliciting further information which may throw light on the causation of certain mysterious occurrences.

ROUTE AND INSTRUMENTS.

It is not the object of this paper to weigh the relative advantages of the different routes by which one may gain access to the antrum. To most of us, the making of a perforation beneath the inferior turbinate commends itself as simplest, safest and most satisfactory, and it is to the test as carried out in this situation that my remarks will apply.

Nor do I wish to consider the instruments used. It might be mentioned in this connection, however, that Moritz Schmidt was the first to recommend the inferior meatus as a diagnostic route and employed a Pravaz syringe fitted with a bent needle in order to aspirate the contents of the cavity. Subsequently Lichtwitz practised exploratory irrigation by means of a straight trocar and cannula. Modifications in which the cannula is curved, or sharpened to serve also as a trocar, or furnished with a double streamway, have been recommended from time to time. Personally, I prefer and use almost exclusively Lichtwitz's instrument; this, when strongly made and provided with an extra cannula—the advantage of which is referred to below—should meet all requirements.

DIFFICULTIES AND MINOR ACCIDENTS IN MAKING PUNCTURE.

I shall refer only briefly to the difficulties and slighter accidents that are commonly experienced in making the exploratory puncture, and to the precautions that should be taken to avoid them.

Children.—In patients under twelve years of age puncture from the inferior meatus may be unsuccessful, as usually the floor of the antrum is still high. When it is necessary to employ the test in children it should be carried out from the middle

meatus, or the trocar should be directed obliquely upwards from the inferior meatus. Haike has investigated the accessory cavities in children by means of X-rays, and his results with reference to these points are of value. Zarniko and Onodi recommend that the antrum be opened only from the middle meatus up to the time of eruption of the first permanent molar.

Narrow type of face.—The configuration of the patient's face should be observed. When the nose is prominent and the anterior wall of the superior maxilla is sunken the puncture must be made further back than usual in the inferior meatus. If this precaution is not observed one may bore in front of the antrum or unwittingly traverse a narrow part of the cavity, and on inflation emphysema of the cheek may be produced, or severe phlegmonous cellulitis may follow infection of the tissues by pus carried from the antrum. Under such conditions it is possible also to injure the lower end of the nasal duct.

Ozæna.—The patients that have given me most trouble in boring have been those with atrophic rhinitis; as a class they seem to have a thick naso-antral wall or a small antrum. Zuckerkandl, Harke, Bergeat and Minder, have remarked upon the small size of the accessory cavities in persons with ozæna; and Haike states that in his X-ray examination of adults with ozæna he found in almost every case defective development of these cavities.

After the antrum is entered and the trocar withdrawn, serum or pus, if present in the cavity under pressure, *e. g.* in a cyst or closed antrum, may drop from the cannula. Aspiration may first be tried, but is usually omitted. Air is gently blown through and the effect observed in the middle meatus; the escape of clear fluid should not be overlooked. In rare instances, when the antrum is occupied by a dental cyst which has burst into the nose, the pus may be found to escape beneath the inferior turbinate.

CONDITIONS PREVENTING PERFLATION OF ANTRUM.

Not infrequently difficulty is at first experienced in blowing through the antrum. Assuming that the trocar is clear and the point free in the cavity, the following possible causes of obstruction may be considered.

(a) In acute cases the ostium may be blocked. If the application of cocaine and adrenalin to the neighbourhood of the ostium fail to reduce the swelling of the mucous membrane, a second cannula should be inserted alongside the first and made to serve as a counter-opening.

(b) A polypus in the antrum may also occlude the ostium. As a rule, it does so intermittently. For a time it may allow free escape, then suddenly prevent this, and the more the intra-antral pressure is increased the more complete does the obstruction become. The valve-like action of the polypus may sometimes be avoided by changing the position of the patient's head, especially by keeping the diseased side under the other.

(c) When the antral lining membrane is swollen or thickened—and occasionally its condition is such as almost to obliterate the cavity—the point of the cannula may readily be embedded in the oedematous tissue. If one has reason to suspect this, the instrument should be pushed forward until the point impinges on the opposite wall and then withdrawn slowly, meanwhile trying to blow through; a level is usually reached at which the air finds free egress.

(d) A dental cyst may fill the entire antrum or only its lower part. If the instrument pierce the cyst a few drops of translucent liquid with cholestearin crystals may escape from the cannula, but attempts to blow through will be futile. On the other hand, the point of the instrument may pass above the cyst into the remaining lumen of the antrum, and the test gives a negative result. In some cases it is possible to enter either the cyst or the antral cavity according to the direction given the instrument while boring.

(e) A cyst of the antral lining membrane may behave in almost the same manner as a dental cyst. The method mentioned under (c) should be tried.

(f) Caseous pus and very tough mucus may offer resistance to the passage of injected air, but usually this is overcome by moving the cannula to and fro and blowing at different depths.

DANGER OF FORCIBLE PERFLATION. FATAL CASE.

Whatever the intra-antral condition may be—and very often no opinion can be hazarded as to its nature—the tendency is to blow strongly enough to force a passage by the ostium. I would earnestly warn against any such attempt. A number of years ago I had an experience which demonstrated that this simple test of exploratory puncture may be fraught with the most serious consequences if air be injected into a presumably closed antrum under moderate pressure such as is capable of being exerted by a rubber syringe.

In the case to which I allude, the patient was a man aged about forty-five, who had symptoms suggesting suppuration in the right antrum. The naso-antral wall was easily pierced by Lichtwitz's trocar and cannula, and on trying to blow

air through the antrum a slight gurgling sound was produced, but nothing escaped by the ostium. This procedure was followed by very severe and prolonged coughing; the patient broke into perspiration and afterwards lay prostrate for three quarters of an hour.

A week later the test was repeated, and, as before, air could not be forced through the antrum. A second cannula was then introduced alongside the first. On further attempts at inflation a low gurgling sound could be heard such as might be produced by air passing through fluid in the antrum. He said that he had no pain, but that there was a tickling sensation in the right side of the larynx inclining him to cough. A few moments later he said that he felt it going to his arm, then without warning or any apparent change he became unconscious, his head fell forward, and he almost dropped from the chair. His breathing was loud, pulse feeble, and he perspired profusely. His own physician and several other medical men saw him within a sort time of the onset of his illness, and various remedial measures were employed. In about three hours he seemed somewhat revived, but began to moan as if in pain. Subsequently, the moaning was continuous, the breathing rapid and shallow, the eyes wide open and sometimes turned far up to the left, and there was constant violent jerking of the right leg. Without developing any other outstanding symptom or regaining consciousness the patient died fourteen hours from the time the exploratory puncture was made.

SYMPTOMS CAUSED BY FORCIBLE PERFLATION.

This case naturally led me to be on the outlook for any untoward conditions that might arise during the performance of the test. Of the many hundreds of patients on whom I have since made the exploratory puncture and perflation, about a dozen have presented symptoms which, I think, are to be ascribed to the procedure. In these cases nothing unusual was noted as regards the thickness of the naso-antral wall, but on trying to blow air through none escaped from the antrum. After repeatedly changing the position of the cannula and trying to insufflate, the patient began to cough. This was attributed to a tickling sensation in the larynx, or to irritation, oppression, or even pain in the chest, usually opposite the middle or lower end of the sternum. The cough was dry, at intervals or in violent rapidly recurring paroxysms, and lasted from a few minutes to a quarter of an hour. The patient perspired freely and became faint; retching and vomiting were uncommon; considerable prostration might continue for about half an hour. One patient complained that his right hand felt paralysed (the puncture had been made on the left side). These symptoms in themselves are comparatively trivial, but they might have led to others of a graver nature had they not been regarded as a danger signal.

FATAL CASE FOLLOWING PERFLATION OF FRONTAL SINUS.

The following case probably belongs to the same category as those just described, but the cavity perflated at the onset of the fatal illness was the frontal sinus.

The patient, a strong, healthy man, aged forty-six, had nasal polypi and supuration in both antra, both frontal sinuses, and the right sphenoidal sinus. The polypi had been removed and the antra opened from the alveolus. The question under consideration was that of the treatment of the frontal sinuses. In order to estimate the amount of pus in these cavities a cannula was passed and the contents blown out. A communication existed between the two sinuses, for, on insufflating one, air-bells and pus appeared beneath the ostium frontale on the other side. This procedure had been carried out at several previous visits without any untoward results when, on one occasion, on removing the cannula the patient's head fell forward a little. When asked if he were well, he quickly raised it as if awaking, but again dropped it. As he was apparently helpless he was laid down. He complained of the heat and of his wrists feeling weak. In reply to inquiries he said that he had no pain and that he did not know what was wrong. When told to draw up his limbs he seemed unable to do so, but in about half an hour he moved the left leg, and later the right leg and left arm. In three quarters of an hour, when his own physician arrived, his pupils were dilated and reacted only sluggishly to light, and he answered "yes" to all questions. In three hours he was able to move all his limbs and to sit up in bed. At 10 p.m., six hours after the onset of his illness, the urine was drawn off and found to contain neither sugar nor albumen, the pulse and temperature were normal, and after consideration of a question he could answer "yes" or "no." The next morning, early, he was very violent and shouted, and was calmed only by morphia. At 9 a.m. he was comatose; occasionally during the day he became excited. At 3 p.m. the breathing was interrupted, and he seemed about to die, although the pulse was good. In the evening the temperature was 103° F., and pulse from 110 to 160; he was quieter and answered "yes" and "no" to questions, but it is doubtful if he understood them. There was occasional opisthotonos. About 3 the next morning he began to have convulsions, which recurred rapidly, and he died at 7 a.m., about forty hours from the onset of the attack.

A *post-mortem* examination of the head was made by Dr. John Anderson, Pathologist to the Victoria Infirmary, from whose report the following extracts have been taken: "The dura mater is not abnormally adherent to the skull: it is somewhat congested. The sinuses are filled with blood and *post-mortem* clot. There is no excess of fluid in the subdural space. The pia arachnoid shows congestion of the veins of the sulci and a few slight opacities due to areas of thickening; the Pacchionian bodies are unusually prominent. On section of the brain a general hyperæmia is met with, the white matter showing a pronounced condition of *puncta vasculosa*. The brain substance in addition to the hyperæmia is slightly œdematous, and the ventricles contain a slight excess of fluid. No gross lesion is found in the brain: there is no indication of cerebral hæmorrhage, embolism, thrombosis, focus of suppuration, or meningitis. On stripping the dura mater from the orbital plate of the frontal bone a small aperture is found on the left side in a line with the posterior end of the cribriform plate. The aperture is circular, about 3 mm. in diameter, with smooth edges, and leads to a recess in the bone large enough to contain half a pea. This is filled with a pultaceous material, after

cleaning out which no exit from the recess can be detected with a fine probe. On removing the roof of the sinus and a small bridge of bone between its posterior end and the recess, a tortuous communication between the latter and the frontal sinus can be traced. The frontal sinuses are very large and communicate with one another; they are filled with pus and lined with a fleshy, congested, pyogenic membrane. The sphenoidal sinuses are also large and partly filled with granulation tissue." It should be clearly understood that although the roof of the left frontal sinus presented the small erosion noted, the latter was perfectly covered by normal dura mater.

Before commenting on the above experiences I shall briefly relate mishaps that have befallen others.

CESSATION OF RESPIRATION, CONVULSIONS AND PROLONGED UNCONSCIOUSNESS FOLLOWING WASHING AND PERFLATION OF ANTRUM.

In 1906, Neuenborn reported a case which he attributed to cocaine poisoning, but which closely resembles those under consideration.

A man, aged twenty-three, presented symptoms of double antral suppuration. The left antrum was punctured and washed out twice. At the third visit, a smaller quantity of cocaine than usual was applied to the right inferior meatus, the antrum was punctured for the third time, and a considerable amount of pus washed out. Air was then blown through the cavity to get rid of the excess of water, the thin trocar was withdrawn, and the patient was asked how he felt. While replying he fell to the ground as if struck by lightning. Respiration had ceased, the whole body was rigid, and he appeared to be dead. The heart's action, however, was found to be normal, so artificial respiration was begun and continued at intervals as required throughout the day. Injections of ether—although the pulse kept normal—amyl nitrite and applications of cold to the head were tried. Later, tonic and clonic spasms alternated. During the night he had a pure epileptic seizure and seemed about to die. Unconsciousness was complete. This condition lasted for three days. On the fourth day he began to rouse himself unwillingly when loudly called. On the fifth he was somewhat better, and on the sixth he recognised a friend. From then onwards he visibly improved. Neuralgic pains set in, especially in the sciatic and trigeminus, on the seventh day. For long afterwards he was weak and nervous.

Neuenborn at first thought that a communication existed between the antrum and cranial cavity through which he had driven air or water and so produced meningitis. This view was supported by the rise of temperature on the second day, stiffness of the neck and positive Babinski. He now believes that the whole course of the illness, especially the subsequent development of neuritis, shows that the case was one of severe cocaine intoxication.

The following considerations place the latter view in a very doubtful light. The amount of cocaine employed was small, and on two previous occasions the patient had had larger doses without bad effect, so that idiosyncrasy could be excluded. When cocaine does give rise to toxic symptoms these do not set in with sudden unconsciousness, and the course of the illness, even if it terminate fatally, is never so prolonged as in the case described.

DEATH AFTER WASHING OUT ANTRUM.

Neuenborn also relates that several years previously in the same town a patient died in a doctor's consulting room after having

had the antrum washed out. Death was supposed to have been due to cardiac failure, but Neuenborn now attributes it to cocaine poisoning.

In the present state of our knowledge, both Neuenborn's case and that of his townsman would probably be regarded as accidents occurring in the course of the exploratory perforation or washing of the antrum, and as having nothing to do with the toxic influence of cocaine.

TWO CASES, ONE FATAL, OF EPILEPTIC SEIZURES FOLLOWING SYRINGING OF ACCESSORY CAVITIES.

In the discussion following Neuenborn's communication, Henrici reported two cases in which an epileptic seizure had followed the syringing of an accessory cavity; the patients were neither nervous nor had they had epilepsy previously.

The first patient had been having his antrum and frontal sinuses syringed out daily for about a month; blunt cannulas were used. One day during the washing the patient suddenly fell from his chair apparently in an epileptic fit with heavy breathing, blue aspect, small irregular pulse, and firmly clenched teeth; he soon recovered. A few days later, when he was quite well, the syringing was resumed, and again he had a seizure; the breathing soon ceased and later the pulse; artificial respiration and tracheotomy were employed, but death supervened; the *post-mortem* examination was negative.

Henrici's second patient was beginning to have her antrum washed from the middle meatus when an epileptic attack set in. Under artificial respiration and heart massage she came to herself again. Paresis of the extremities with disturbance of consciousness persisted for long afterwards.

FATAL APOPLEXY AFTER ANTRAL PUNCTURE.

Hajek, at the meeting of the German Laryngological Society in 1907, reported two serious cases. The first was that of a man, aged sixty-six, who was diabetic and had marked arterio-sclerosis. Eight days previously acute empyema of the left antrum had set in. After perforating from the inferior meatus, the patient became unwell and seemed unconscious. Paralysis of the left half of the body and face indicated cerebral apoplexy, from which he died in thirty-six hours.

SUBPERIOSTEAL ABSCESS WITH METASTASIS AFTER ANTRAL PUNCTURE.

Hajek's second case was that of a woman, aged thirty-five. After the antrum was punctured, air blown through escaped by the nose, but on trying to syringe there was resistance which could not be overcome. The patient had a rigor on each of the following three days. Swelling developed over the left temple and on the left wrist. On opening the antrum the greatly swollen mucous membrane beneath the anterior wall was found to be raised by a subperiosteal abscess, so that the lumen of the cavity was quite obliterated. After incising the abscess and draining the antrum the condition cleared up. In this case probably the needle crossed the very narrow antrum and, by infecting the subperiosteal tissue, gave rise to an abscess. The pus under great pressure infected a perforating vein, hence the swelling of the cheek and the later metastatic inflammation of the wrist.

In the discussion that followed the reading of Hajek's paper Moritz Schmidt, B. Fränkel, Kümmel, and Kayser recounted the undernoted interesting experiences.

SWELLING OF CHEEK AND EYELIDS.

Moritz Schmidt referred to two cases in which, on beginning to syringe, swelling of the cheek and eyelids set in. He considered that the accident was due to the antral cavity not extending to as low a level as usual, and that in consequence the trocar passed directly from the outer wall of the nose to beneath the skin.

TRANSIENT HEMIPLEGIA AFTER PERFLATION OF (?) ETHMOIDAL CELL.

In a third case the patient was a medical man who had been greatly inconvenienced for years by crusting in the nose. Schmidt examined him carefully and at length found a very sensitive area behind the middle turbinate. The posterior end of this body was removed, and a sharp needle was pushed outwards and entered a cavity which may have been the sphenoidal sinus but probably was a much distended ethmoidal cell. Pus immediately oozed out. Some air was then pumped in. At the same moment the patient collapsed with complete paralysis of the left arm and leg. Fortunately this passed off in about an hour, and next morning he was quite well. Schmidt was unable to explain how the paralysis had arisen. He thought that he had entered the brain, but this

was not possible, as he had operated on the left side, and the paralysis also was left sided.

SWELLING AND ABSCESS OF CHEEK.

B. Fränkel stated that he always made the puncture in the middle meatus. Shortly before, he had had a case in which on washing there was immediate swelling of the cheek. An abscess formed which took long to heal. He thought that a fissure must have been present through which the pus was driven into the cheek.

TRANSIENT HEMIPLEGIA AFTER INSUFFLATION OF FRONTAL SINUS. CASES OF COMA.

Kümmel related the case of a man whose frontal sinus was easily entered and washed out. Air was afterwards blown in, and the patient became paralysed on the opposite side of the body but recovered perfectly in two or three hours. On several subsequent occasions he had had a similar experience. Twice certainly on blowing in air patients who had borne all previous manipulations suddenly fell and remained in a comatose state without paralysis for two or three hours.

HYSTERO-EPILEPSY AFTER ANTRAL PUNCTURE.

Kayser, lastly, told of a lady, who, on having her antrum punctured, fainted, became convulsed and remained unconscious for thirty-six hours; then gradually recovered. He had regarded the illness as an attack of hystero-epilepsy.

Claus in 1910 contributed a paper entitled, "Four Mishaps, two with Fatal Termination, from Puncture of the Maxillary Sinus."

CYANOSIS AND DYSPNŒA ON PERFLATING ANTRUM.

Claus's first case was that of a girl, aged nineteen, who had been operated upon for suppuration in the left antrum. Subsequently recurrence was suspected, and Claus made an exploratory puncture. While blowing in air obstruction was suddenly experienced, and at the same moment the patient became dyspnœic and cyanosed. She continued so for about ten minutes and had a feeling of depression for some hours. Hysteria and fear could be excluded as causes. An air embolus was suspected. Probably

while the point of the instrument was in the thick spongy wall of the antrum air was forced into a vessel, but as the amount was small it was quickly absorbed.

UNCONSCIOUSNESS, PARTIAL PARALYSIS, AND APHASIA SETTING IN DURING ANTRAL PUNCTURE.

In the second case, a man, aged sixty-eight, became suddenly unconscious while the antrum was being punctured with the Lichtwitz needle. The right arm was flaccid, right leg moved fairly well, there was no facial paralysis, but sensation on both sides was abolished excepting below the left eye. He was very restless and did not reply to questions. The following day he was quieter, but still almost aphasic. He gradually improved, and the paralysis passed off in six days. The seat of the lesion here must have been in the internal capsule of the left hemisphere. Claus thinks that an embolus or hæmorrhage is improbable from the course of the illness, and that one may assume closure of a vessel from arterial spasm due to novocain and adrenalin, although the doses used were only moderate.

CYANOSIS, HEART FAILURE, AND DEATH AFTER WASHING ANTRUM.

In the third case, a young woman had the right antrum washed out from the inferior meatus, as had been done on two previous occasions. Immediately after the procedure she complained of feeling faint and became cyanosed. Pulse and breathing gradually failed. All efforts at resuscitation were in vain. At the necropsy no disease was found in the organs. Death was evidently caused by paralysis of the heart.

UNCONSCIOUSNESS, COLLAPSE, AND DEATH AFTER PERFLATION OF ANTRUM.

The fourth case was that of a woman, aged thirty-six. The antrum was easily punctured with the Lichtwitz needle and air blown in. The patient thereupon collapsed and lost consciousness. The coma deepened, and she died the same evening. The result of the *post-mortem* examination is very fully reported. Briefly, numerous hæmorrhages were found in the heart muscle and in the grey cortex of cerebrum and cerebellum.

Claus is inclined to attribute death in these two cases to novocain poisoning.

SYMPTOMS OF SHOCK OBSERVED AFTER EXPLORATORY PUNCTURE.

Uffenorde, in commenting on Claus's paper, states that not infrequently exploratory puncture of the antrum is followed by disquieting symptoms of shock, which are to be regarded as due to reflex inhibition of the vagus. There may be syncope, rolling of the eyes, clonic convulsions, cyanosis, irregular, weak, slow pulse, and very slow respiration. In his experience women are oftenest affected. Judging from two cases which he observed in robust subjects, he is convinced that such attacks may terminate fatally if camphor and digitalis are not injected.

ABSCESS IN CHEEK AFTER EXPLORATORY PUNCTURE.

Kronenberg, in 1911, wrote a paper on accidents arising from boring into the antrum and their prevention. He reported a case in which after exploratory puncture an abscess formed in the cheek, causing considerable general disturbance. It ultimately burst into the mouth and discharged for about a week.

VARIOUS MISHAPS AFTER EXPLORATORY PUNCTURE.

In the large *Handbuch der speziellen Chirurgie des Ohres und der oberen Luftwege* which is now being published, Boenninghaus, the author of the section on the accessory cavities, states that exploratory puncture of the antrum is accompanied or followed by mishaps much oftener than is known, and that Hajek rendered special service in opening up this question. Boenninghaus has seen abscess in the orbit, and in several instances rise of temperature with pain in the jaw, follow the procedure.

RISE OF TEMPERATURE AFTER FIRST WASHING OF ANTRA FILLED WITH PUS.

Killian read a paper at the meeting of the Society of German Laryngologists in May, 1913, on accidents from washing out the antrum. As a rule, he washes from the middle meatus through the accessory or an artificial opening. Although little or no injury is produced, a rise of temperature occasionally takes place a few hours later. During the past ten years he has met with a number of such cases. In every instance the complication was after the first washing, and the antrum was full of pus which had been retained for long and was more or less decomposed. A case illustrating

the course of events was that of a man whose antrum was washed out with salt solution through the natural opening; two and a quarter hours later he had an acute rigor, and the temperature rose to $37.9^{\circ}\text{C}.$; after three hours it slowly fell again; next day he was quite well; the antrum was frequently washed out subsequently, but without giving rise to any similar disturbance. It is not easy to account for such occurrences. There is no question of infection from instruments or a wound. Probably the explanation lies in the bacterial toxins present in the antrum which had been absorbed in inappreciable amount until disturbed by the first washing.

DISTURBANCE OF VISION AFTER OR DURING WASHING ANTRUM.

Killian also relates the case of a woman who occasionally experienced during or after washing the antrum, which was carried out regularly, sudden disturbance of vision in the corresponding eye. At first she could see nothing, after a few minutes there was a faint glimmer of light which travelled from right to left, and in ten to fifteen minutes fair vision was re-established. At home she had rigors, and the temperature rose to $38.3^{\circ}\text{C}.$ Next morning all had passed off, excepting that for some days the pupil was wider than the other. The ophthalmologist who examined the patient stated that he had several times observed a similar sequence of events. He was inclined to attribute the disturbance of vision to a small embolus of the central artery of the retina. Killian questions this view and regards a reflex contraction of the vessel as more probable.

FATAL SYNCOPE WHILE WASHING ANTRUM.

Killian states that there is no doubt as to reflexes originating in the antrum, and that attacks of collapse and fainting while the cavity is being washed are thus explained. The irritation probably passes to the vagus. A case occurred in his clinic in which irritation of the vagus led to syncope, and the patient fell dead from his seat. The antrum was merely being washed out, as had been done often previously. The only explanation he can offer is that the water used was probably cold, and that some individuals are specially susceptible to strong vagal reflexes. The *post-mortem* examination was negative; the heart was healthy.

COLLAPSE, PARAPLEGIA, AND AMAUROSIS ON INSUFFLATING ANTRUM.

In the discussion that followed the reading of Killian's paper,

Streit related the case of a medical student in whom the first washing out from the middle meatus led to no complication, but some days later, when about to undertake a second washing, on beginning to exercise pressure with the double bellows, the patient immediately became pale and pulseless. It was also found that he had a paresis of the lower extremities. During the next two hours there was repeated complete amaurosis with momentary intervals of slight perception of light. Prof. Bruckner, who found the fundus normal, thought that most probably an air embolus had lodged in the occipital lobe. The patient remained weak till the evening and then gradually recovered.

RIGORS AFTER SYRINGING ANTRUM. PARAPLEGIA AND BLINDNESS.

Walliczek referred to two cases in which rigors followed not only the first but also subsequent washings. He had also had a case resembling Streit's, and was inclined to attribute the paralysis of the legs and the blindness to a concentrated adrenalin solution.

Siebenmann had also observed severe rigors and high temperatures of short duration after the injection of boric acid lotion into the antrum through an accessory or artificial opening. With reference to attacks of giddiness on syringing the antrum, he pointed out that there are connections between the trigeminus and vagus which explain the frequent occurrence of vertigo in acute antral suppuration.

TWO CASES OF AIR EMBOLISM, ONE FATAL, AFTER EXPLORATORY PUNCTURE.

Bowen reported in 1913 two cases of air embolism following this test.

The first was that of a woman in whom the puncture was made with difficulty owing to the unusual thickness of the bone. After inserting the needle it was found impossible to force air through with the syringe, so the needle was withdrawn slightly for a second attempt, which was also unsuccessful. During the third attempt the patient, without the slightest warning, became rigid and cyanotic, and a moment or so later convulsive movements of the extremities, foaming at the mouth, and stertorous breathing set in. She remained thus for seventy-two hours. The first night the temperature was 101.4° F., pulse 75, and respirations 20. The temperature remained about 100° until the third day. She vomited the first evening and again on the third day. There was profuse perspiration, especially at night, and muscular twitching almost continuously. Occasionally she became quite violent and required the use of a restraining sheet. During the fourth day a partial paralysis of the left arm was apparent. She was able to

sit up in bed on the fifth day, and would converse when spoken to. She was discharged on the seventh day.

The second case was that of a man, aged twenty-four. The right antrum was washed out from the inferior meatus with negative result. The left side was punctured in the same manner, but as the air was being injected, no unusual force being used, the patient became rigid with half closed eyes and eyeballs rolled backward; relaxation followed with profound cyanosis and slight muscular twitching. He was placed in the recumbent position, and beyond a few gasping respirations, at the rate of about three per minute, there was little evidence of life. Hypodermics of strychnine, adrenalin (15 m.), and whisky were given, and artificial respiration was carried on continuously. At the end of about twenty minutes the cyanosis cleared somewhat, and it was thought that the danger was over, but in a few minutes it deepened again, and death took place about an hour after the puncture.

At the *post-mortem*, on removing the sternum the pericardium immediately bulged forward into the opening. Incision into the pulmonary artery was followed by the sharp, hissing sound of escaping air and collapse of the distended heart. On opening the antrum, the mucous membrane of the outer and inner walls and nearly all the roof was found detached. There was no indication of the needle having penetrated beyond the antrum, and there was no trace of hæmorrhage in the cavity.

Bowen considers that the only explanation of the passage of air into the general circulation is that the needle penetrated the mucous membrane of the roof and air was forced between the lining membrane and bone, thus opening up numerous capillaries. In exploring the antrum he advises the injection of solution without preliminary perflation.

ENTRANCE OF AIR INTO JUGULAR VEIN DURING SUPPOSED PERFLATION OF ANTRUM.

In a case in which I believed the point of the cannula to be in a good-sized antrum, on insufflating, a low gurgling sound was produced, apparently in the cavity; on again blowing, gurgling was heard in the neck, and on repeating this a loud gurgling sound unmistakably passed down the side of the neck. The patient remarked that she felt this in the neck, but she was in no way affected. On removing the cannula it was found to contain a little blood. The antrum was now opened from the alveolus and proved to be empty. In this case the trocar must have crossed the antrum, pierced its thin outer wall, and reached the pterygo-maxillary fossa. Here the point of the instrument probably entered the pterygoid plexus of veins, and the air injected found its way into the internal or external jugular vein, both of which communicate with the plexus. It is surprising that this accident has not been

previously reported, for it may readily occur, owing to the thinness of the outer wall of the antrum.

LIST OF ACCIDENTS DUE TO PUNCTURE, PERFLATION, OR WASHING OF ACCESSORY CAVITIES.

The accidents referred to in this paper may be grouped as follows:

(1) Trocar traverses narrow antrum or passes below high antrum, and reaches canine fossa. Air blown through causes emphysema (common occurrence); solution, or pus from antrum, forced through produces infiltration or abscess with constitutional symptoms (Kronenberg).

(2) Pus driven through fissure in antral wall causes abscess in cheek (Fränkel).

(3) Trocar infects subperiosteal tissue in antrum, causes abscess, pyæmia and metastasis (Hajek).

(4) Trocar enters orbit, emphysema (Hajek) or abscess (Boeninghaus, Nager, Gerber) results.

(5) Trocar traverses antrum, pierces outer wall, and enters pterygoid plexus of veins in pterygo-maxillary fossa; air blown thence into communicating internal and external jugular veins (Brown Kelly).

(6) Puncture supposed to give entrance to infection leads to fatal septic pemphigus (Culbert).

(7) Washing out pus causes rigor and rise of temperature (Killian, Walliczek, Siebenmann), with pain in the jaw (Boeninghaus).

(8) Disturbance of vision accompanies or follows washing out antrum (Killian) or insufflating air (Streit, Walliczek).

(9) Hystero-epilepsy (Hajek, two cases, Brown Kelly), hysterical mutism (Brown Kelly).

(10) Symptoms of shock (frequent) (Uffenorde, etc.), fatal cases reported or referred to by Claus, Neuenborn, and Killian.

(11) Insufflation causes cyanosis and dyspnoea (Claus), cyanosis, rigidity, stertor, and convulsive movements of limbs (Bowen, two cases, one fatal).

(12) Epileptiform seizure, paresis of limbs and unconsciousness (Henrici); epileptiform attack, cyanosis, cessation of respiration and heart's action, death (Henrici); cessation of respiration, convulsions and unconsciousness (Neuenborn); fainting, convulsions, unconsciousness for thirty-six hours (Kayser); unconscious-

ness, stertor, jerking of right leg, death (Brown Kelly); from insufflating frontal sinus—collapse, loss of intelligence, maniacal excitement, opisthotonos, convulsions, death (Brown Kelly).

(13) Unconsciousness, left hemiplegia, death (Hajek); transient hemiplegia from insufflating (?) ethmoidal cell (Schmidt), or frontal sinus (Kümmel, several cases); unconsciousness, hemiparesis and aphasia (Claus); unconsciousness, collapse, death (Claus); collapse, paraparesis and amaurosis (Streit, Walliczek).

DEATHS.

Nine fatal cases as indicated above have been referred to or reported by Neuenborn, Henrici, Hajek, Claus (two), Killian, Bowen, and Brown Kelly (two).

CAUSES ASSIGNED FOR ACCIDENTS.

Faults in technique and anatomical abnormalities account for groups 1-6. Dehiscence of the walls of the antrum and frontal sinus is commoner than generally supposed and should be kept in view in this connection.

Explanations have been already offered of groups 7 and 8.

The temperament of the patient probably underlies group 9.

Groups 10-13, which include the more serious accidents and the deaths, are of chief interest. It should be mentioned that the classification here adopted is largely arbitrary and is based mainly on the prominence given to the various symptoms in the original reports. Why is this simple little operation of exploratory puncture and insufflation followed occasionally by such disasters as just related, while much severer procedures in the nose and accessory cavities do not give rise to symptoms at all comparable in gravity? The explanations offered will be briefly considered.

Coincidence.—In Hajek's case the onset of apoplexy after antral puncture may have been merely a coincidence, as the patient was aged sixty-six and had diabetes and marked arteriosclerosis. It is evident, however, as Boenninghaus has remarked, that the many severe conditions reported cannot be regarded as accidental complications.

The local anæsthetic.—In most instances this could be positively excluded as the cause of the accident. Neuenborn attributed his patient's prolonged illness to cocaine poisoning, but the improbability of this ætiology has been already discussed. Claus assigned

his two deaths to novocain poisoning, but aptly remarks that it is strange a fatal issue should occur twice in puncturing or washing out the antrum, while no bad effect has followed the innumerable applications of novocain in other rhinological procednres.

Air embolus.—In several of the cases (Antrum: Claus, 2; Bowen, 2; Brown Kelly. Frontal sinns: Kümmel, several cases; Brown Kelly. Ethmoidal cell: Schmidt) the grave symptoms set in during, or immediately followed, insufflation, and air embolus has been suggested as an explanation. The probability of this occurrence might be better gauged if the exact cause of the accident—puncture, insufflation or injection of fluid—had been mentioned in all the cases reported; in many, however, this information is lacking. Claus thinks that while the point of the trocar was in the spongy bone air may have been forced into a vessel. Bowen assumes that in his fatal case air penetrated the capillaries, for the mucons membrane was detached from the bony wall of the antrum and air was present in the pulmonary artery. I have mentioned another accident which may readily occur and lead to pulmonary embolism, namely, if the trocar pierces the outer antral wall and enters the pterygoid plexus of veins which communicates with the jugular veins. Air cannot pass from the venous circulation through the lungs and be arrested in the brain; in order, therefore, to produce a cerebral air embolus air must be injected into the carotid or one of its branches.

Spasm of cerebral arteries.—Claus attributes his case of apoplexy, which completely recovered within six days, to arterial spasm caused by novocain and adrenalin, although only a moderate amount was used. It appears to be an established fact that cerebral angiospasm is sometimes focal, and that the site is very frequently the motor pathway in or above the internal capsule (Russell). If this condition existed for a short period it might account for temporary paralysis with or without aphasia. Claus's patient was sixty-eight years of age and may have had degenerated arteries, but it is impossible to determine whether the exciting cause was the circulation in the blood of the substances mentioned or nervous disturbance due to the puncture; in the latter case the apoplexy could be regarded only as a coincidence.

Reflex irritation of vagus.—Hajek states that he has repeatedly seen patients become unwell for a considerable time when on making an exploratory washing the injected fluid was dammed in. The symptoms were sweating, great palpitation, and pulse 45 to 60. He considers the cause to be reflex irritation of the vagus through

the second branch of the trigeminus which supplies the antrum. Uffenorde and Siebenmann have also referred to reflexes of antral origin; and Killian thinks that these may be excited by injecting a cold solution. I have alluded to my experiences in about a dozen cases in which, when unable to blow air through the antrum, on persisting in the attempt, the patient began to cough, owing to irritation felt in the neck or chest, and became prostrate.

SIMILARITY OF ACCIDENTS ARISING FROM ANTRAL AND PLEURAL PUNCTURE.

The grave symptoms which have been mentioned as resulting from exploratory puncture of the antrum are strikingly similar to those which occasionally arise during the production of artificial pneumothorax. The following symptoms have been observed after the latter procedure: Pallor, dyspnoea, cyanosis, unconsciousness, rapid pulse and respiration, diplopia, amblyopia, tonic and clonic contractions of groups of muscles, general convulsions, maniacal excitement, pareses, and paralyses. These symptoms have been attributed in some cases to gas embolism (pulmonary or cerebral) and in others to reflex irritation of the pleura, and, while it is occasionally possible to assign the exact cause, "it is now generally admitted that the symptoms of pleural reflex are not clinically distinguishable from those of gas embolism; and even necropsy may not be decisive, for a fatal dose of gas may have escaped from the blood-vessels of the brain before these could be examined" (Lillingston). As an indication of the frequency and gravity of pleural reflex it may be mentioned that Zesas in 1912 had collected fifty-four cases of convulsions following operative measures on the pleura, of which twenty-one proved fatal.

INADEQUACY OF THEORIES ADVANCED TO ACCOUNT FOR ACCIDENTS.

In the present state of our knowledge the significance of the symptoms and course of illness in the cases reported does not admit of interpretation. I have consulted several prominent physicians in regard to my own cases, but none has offered an explanation. In my first patient cortical irritation was manifested, but why was so small an area (the leg) involved? If an air embolus were present, how did the air enter the circulation? And how is the attack of coughing and prostration experienced when the test was tried the week previously to be explained? On the other hand, if the theory

of air embolus be put aside and that of reflex action favoured, are we entitled to assume that a minor operation on the antrum is capable of exciting reflexly a grave train of symptoms which terminates fatally? At the necropsy of my second patient only pia-arachnitis was found. Why did this set in so suddenly, or to what condition was it secondary? The similarity of accidents caused by antral and pleural puncture has been referred to, and as those due to the latter are the commoner they are likely first to afford a solution of the problem.

REFERENCES.

- HAIKE, H.—“Die Röntgenuntersuchung der Nasennebenhöhlen der Kinder,” *Arch. f. Laryng.*, Bd. xxiii, S. 206.
- ONODI, A.—“Die Nebenhöhlen der Nase beim Kinde,” Würzburg, 1911.
- NEUENBORN.—“Ueber einen Fall schwerster Kokainvergiftung,” *Münch. med. Wochenschr.*, 13. August, 1907, S. 1653.
- HAJEK, M.—“Üble Zufälle bei der Kieferhöhlenpunktion,” *Verh. d. deutsch. laryngol. Gesellsch.*, Würzburg, 1908, S. 163.
- HAJEK, M.—“Pathologie u. Therapie d. entz. Erkrank. d. Nebenhöhlen d. Nase,” 3te Aufl., Leipzig, 1909.
- CLAUS, H.—“Vier üble Zufälle, darunter zwei mit tödlichem Ausgange, bei der Punktion der Oberkieferhöhle,” *Beiträge z. Anat. Physiol. Path. u. Ther. des Ohres.*, u. s. w., Bd. iv, S. 88, 1910.
- UFFENORDE, W.—*Wissenschaftlicher rhino-laryngologischer Jahresbericht*, 1909–1911; *Monatsschr. f. Ohrenheilk.*, 1911, S. 1317.
- KRONENBERG, E.—“Ueber üble Zufälle bei der Anbohrung der Oberkieferhöhle und deren Verhütung,” *Zeitschr. f. Laryng.*, Bd. iv, S. 285, 1911.
- BOENNINGHAUS.—“Die Operationen an den Nebenhöhlen der Nase,” *Handb. d. spez. Chirurgie d. Ohres u. d. oberen Luftwege*, Bd. iii, S. 93.
- KILLIAN, G.—“Ueber üble Zufälle bei Kieferhöhlenspülungen,” *Verh. d. Ver. deutsch. Laryng.*, 1913, S. 217.
- BOWEN, H. M.—“Two Cases of Air Embolus following Exploratory Puncture of the Antrum of Highmore,” *Annals of Otol., Rhinol., and Laryngol.*, March, 1913.
- CULBERT, W. L.—“Report of a Case of Chronic Suppuration of the Antrum of Highmore; Puncture followed by Septic Pemphigus and Death,” *Laryngoscope*, 1910, p. 824.
- LILLINGSTON, CLAUDE.—“Avoidance of Sudden Death from the Induction of an Artificial Pneumothorax,” *Lancet*, 1913, vol. ii, p. 796.
- ZESAS, D. G.—“Ueber das Auftreten von Krampfanfällen bei Eingriffen an der Pleura,” *Deutsche Zeitschr. f. Chir.*, Bd. cxix, S. 76, 1912.

SOCIETIES' PROCEEDINGS.

BRITISH MEDICAL ASSOCIATION.

*Meeting at Aberdeen, July, 1914.*DR. H. LAMBERT LACK, *President, in the Chair.**Abstract Report by MR. HAROLD WHALE.**(Continued from p. 538.)***Discussion on Hæmorrhage in Tonsil Operations.¹**

Sir W. MILLIGAN asked Dr. Hill to define exactly what stump there was left after a complete enucleation for the hæmostatic blade of his instrument to grasp and crush. He looked upon a complete enucleation as leaving nothing in the faucial isthmus than that portion of the superior constriction of the pharynx which formed its floor.

Dr. MACKENZIE BOOTH asked Dr. Hill for further details regarding the case of hæmophilia in which he had operated. According to Dr. Bullock true hæmophilia is one of the rarest conditions, and probably in such a condition excision of the tonsil should not be undertaken. Dr. Booth deprecated any unnecessary complication in tonsil guillotine, simplicity in an instrument in such general use being very desirable.

Dr. WATSON-WILLIAMS said the method of utilising the grasp in these tonsillectomes, which Whillis had introduced in this country, enabled one to use the crushing instruments with success. Mr. O'Malley's instrument had been improved by the adoption of this handle instead of his original thumb-sliding blade, and with his leaded slot undoubtedly went far to crush any stump and to arrest hæmorrhage.

Mr. JOHN F. O'MALLEY congratulated Drs. Hill and Elphick on this very ingenious modification of Ballenger's instrument. It promised to be effective in diminishing the amount of hæmorrhage during operation. He had estimated the hæmorrhage in 415 cases, his conclusions being supported by similar observations in over 2000 cases in all, and had found the average loss to be a fraction over 3 drms. per patient at the time of operation. The operations performed were complete guillotine enucleations by the instrument which bears his name. In this series he had only had one case of serious bleeding, which set in twenty-four hours after operation, but was arrested spontaneously by the time that the child reached the hospital. The perfect guillotine for the purposes of tonsil enucleation must be capable of enucleating cleanly and completely any compact mass of tonsillar tissue with its capsule, which needs removal, with a slight or moderate amount of hæmorrhage, and easy to manipulate by any surgeon of average dexterity. A single-bladed instrument answered all these purposes very efficiently. In the attempt to carry out this ideal, he gave the following details of his instrument, which he considered essential and always desired to insist upon in construction: (1) A thin ring, about $\frac{1}{16}$ in. on cross section and forged in one piece. (2) The upper margin of the ring must be square edged and not bevelled. (3) A recess in the inner aspect of the ring filled flush with lead to receive the thrust of the blade. (4) A slightly dulled blade.

¹ For introductory paper see p. 545.

(5) A D-shaped opening. (6) A shaft and blade, $6\frac{1}{2}$ in. long, the handle joining the shaft at an obtuse angle. (7) When the blade is driven home the two bars of the handle must not approximate closely, or it is impossible to grasp with precision, and the rotation movement at the end of the operation is more difficult to perform. The thin ring gives strength without bulk, and facilitates its insertion on the deep aspect of the gland. This is a point of considerable importance when dealing with tonsils fixed by inflammatory adhesions and also those commonly described as flat. The square (non-bevelled) edge of the opening is capable of raising a fold on a flat skin or mucous surface, and therefore grips a fixed or flat tonsil and prevents slipping when bringing it forward to the anterior faucial pillar. The leaded recess is a factor in hæmorrhage, by insuring the blunt severance of the tonsillar vessels and attachments, this effect being increased by the very slow insertion of the blade. The blade should be slightly duller edged than that used in the old type of guillotine, but capable of cutting cleanly if driven through a slotted ring. The soft metal permits sufficient thrust to sever the tonsil attachments to a fine film, so that the severance can be completed by a quick rotation of the instrument on the long axis of its own shaft. This movement applied a single twist torsion action to the vessels already bluntly severed. There should be no need for traction, and to ensure this it is well to see that the lead is flush with the edges of the recess and that the blade is of the sharpness indicated above. In a properly made instrument renewal of the lead is not necessary before the completion of 500 operations. The D-shaped opening gives more space posteriorly without increasing the width of the instrument, and if the straight posterior edge is kept parallel with the anterior pillar the lower pole of the tonsil is never missed. The long shaft placed at an open angle with the handle enables the latter to clear the patient's chin and shoulders, and facilitates the rapid rotation movement which completes the enucleation.

Dr. HILL, in reply, admitted that a set of hæmorrhagic guillotines meant an expensive outlay. As regards the complicated nature of the instrument it only differed from the Ballenger-Sluder instrument in that there was additional Mackenzie blade and a ratchet for clamping the crushing blade. A simpler and cheaper arrangement was contemplated by adding an additional blade with a crushing edge to the Mackenzie type of guillotine. The Ballenger pattern was, however, an efficient and genuine one-handed guillotine, which could scarcely be claimed for the thumb-driven instruments which really required the use of two hands to drive home the blade with a dulled edge in enucleation by the Whillis method. Mr. Elphick, however, was responsible for the inception and construction of this particular hæmorrhagic guillotine, and therefore any credit or discredit connected therewith belonged to him. He (Dr. Hill), while not aiding Mr. Elphick in the inception, had no hesitation in abetting him in the practice of this improved technique.

Discussion on Difficulties and Dangers of Exploratory Puncture of the Antrum of Highmore.¹

Mr. T. JEFFERSON FAULDER, in ten years' practice, had observed several of the accidents mentioned by Dr. Kelly in exploratory puncture of the antrum. They include wounds of the canine fossa, of the orbit, of the

¹ For introductory paper see p. 556.

pharyngeal wall. They resulted in emphysema, cellulitis, and hæmatomata, and in failure to carry out the exploration. So far as he had been able to observe, these accidents are due: (a) To want of appreciation of the anatomy of the outer wall of the nose; (b) to failure to realise the difficulties and to follow guides given, *e. g.* when very dense bone is encountered it generally means that the trocar is in the wrong place; (c) and to want of skill. Emphysema is a less serious event than cellulitis. Therefore, as safeguards against possible accidents, he recommended: (a) That air be injected first before the lotion is turned on. The whistling sound which air makes on issuing from the natural opening is, in itself, characteristic, and a good indication that the cannula is really in the antrum. If, by chance, the end of the cannula is somewhere else, then the whistling sound is absent, and emphysema results. In his experience emphysema produced in this way had not resulted in cellulitis, whereas injection of lotion into the wrong place had nearly always done so. (b) If a straight trocar is correctly placed in the antrum it will stay in that position, lying obliquely against the columella. If it falls away from that position it is not in the antrum, but, for example, has passed between the muco-periosteum and the bone in the inferior meatus. (c) After washing out an antrum it appears to be a good plan to give it a good final douche with air, because it cannot be an advantage to leave a pool of lotion in a cavity like this. (d) Where an accessory opening is present exploratory puncture becomes unnecessary. Unfortunately, we cannot, without special examination, say whether there is an accessory opening or not. If there is one, all conservative treatment can be carried out through it, and this, at any rate in the case of a nervous patient, is a great advantage. None of these accidents to which he had alluded had happened to himself, but the case which he was about to relate shows that success in the puncture is not the last word to be said. One day in December, 1913, a patient, man, aged thirty-one, was referred to him for examination of the nose. He complained of a cloud before his eyes, especially the left, for fourteen days, mainly affecting the nasal field; also of some pain behind the eyes. He had similar attacks three years ago, affecting first the left and then the right eye. The left disc was definitely hyperæmic and its edge blurred. Faint stippling of the left macular region. Vision: R.V. = $\frac{6}{18}$, L.V. = $\frac{6}{60}$. Septum irregular, with some slight œdema high up. Posterior ends of turbinals swollen. Transillumination: Right crescent, good: left, very poor. He punctured the left antrum in the usual way, first passing a wool carrier bearing a small pledget of cotton-wool, damped with 10 per cent. cocaine and adrenalin, along the inferior meatus. Nothing special was noted about the patient or about the puncture. As he was beginning to inject air through the trocar the patient was seized with a kind of epileptic fit and, remaining semi-conscious, was admitted to the ward. December 9: Temperature, 98° to 99° F.: pulse, 90 to 100: vomited several times, sitting up to do so. Although apparently conscious did not feel the prick of needles. Condition suggested hystero-epilepsy. Pupils equal and active. Tendon reflexes very variable. December 10: A succession of fits, necessitating chloroform. Each attack commenced with rolling-up of the eyeballs. Clonic movements of the limbs, now on the left, again on the right. Cyanosis, loss of reflexes, and incontinence. Moist sounds in the chest and great cyanosis. Injections of digitalin and atropin. December 11: Cyanosis much less. Patient appeared to recognise his relations. Temperature rose to 103.5° F. December 12: Temperature, 98° F. No fits since the second day. Could not be fed

by the mouth, rectal injections always returned. Respiration very laboured, only the upper thoracic muscles being used. December 13: Temperature, 102.6° F.; pulse, 160. The patient gradually sank and died early on December 13. *Post-mortem*: All viscera perfectly healthy. Special attention was paid to the accessory sinuses, which were all quite healthy. Optic nerve looked normal and had no unusual relations. The meninges and surface of the brain showed nothing abnormal. The brain was put in formalin for hardening. On serial sections nothing abnormal was discovered except an appearance of softening in the neighbourhood of the internal capsule. This might have been due to failure of the hardening fluid to penetrate. The microscopical report is not yet forthcoming. No direct connection between the puncture and the fatal issue could be made out. It might be called an accidental coincidence or it might be analogous to cases of which one has heard where an aortic aneurysm ruptures during an attempt at oesophagoscopy. A somewhat similar case (Schneider, of St. Petersburg) is reported in the *International Centralblatt*, June, 1914.

Mr. HASTINGS asked Dr. Brown Kelly what was found *post-mortem* in the case he had described. He agreed that the explanation suggested by Dr. Brown Kelly, that the cannula had passed through both walls of the antrum and entered the pterygo-maxillary fossa, was the right one, because, though he always made a point of moving the handle of his trocar and cannula to be sure that the end was in a cavity, he had had two or three cases where severe symptoms of collapse, one of which was accompanied by unconsciousness, had followed exploratory puncture of the antrum.

Dr. OLIVER ST. JOHN GOZARTY asked what amount of cocaine was used and what the percentage was, as he had found that the stronger solutions were less toxic, as the mucosa was shrunk quickly thereby.

Dr. J. S. FRASER: In Dr. Logan Turner's clinic in the Royal Infirmary, Edinburgh, the maxillary antrum is punctured by the inferior meatal route—usually with the Lichtwitz trocar—and lukewarm sterile normal saline is at once injected. During the last ten years the speaker had occasionally seen minor accidents—perforation of the cheek and consequent swelling, perforation of the roof and of the posterior antral wall, etc., but he had never once seen any of the serious conditions Dr. Brown Kelly had mentioned—*e.g.* blindness, paresis of the limbs, coma and death. He thought that this immunity from serious complications might be due to the fact that they did not inflate air and so supported the probability of the deaths recorded and collected by Dr. Kelly being due to air embolism.

Dr. MACKENZIE BOOTH said that the symptoms described by Dr. Brown Kelly were similar to those he had seen in Prof. Gruber's clinic in Vienna, after the use of the Eustachian catheter causing emphysema. He thought that injection of aseptic fluid into the antrum should take the place of inflation of air. In thirty-seven years' experience, out of a great number of maxillary antrum punctures he had never seen any such untoward result.

Dr. L. H. PEGLER suggested that the reflex effects upon the heart that had been alluded to by Dr. Brown Kelly were probably due to the sympathetic fibres distributed in the companionship of the trigeminal branches (superior alveolar) to the walls of the antrum. The fibres are derived from the carotid plexus through the sphenopalatine ganglion, Vidian and great superficial petrosal nerves. This connection between the carotid plexus and the heart through the cardiac nerves required no

further allusion. On the other hand, there was no direct anastomosis between the branches of the vagus and the trigeminus.

Dr. WATSON-WILLIAMS drew attention to the advantage of the suction exploratory method that he had brought before the Section at the Annual Meeting at Birmingham. They had used the exploratory syringe at Bristol in many hundreds of cases with most satisfactory result and without, so far, any untoward symptoms. By means of this syringe and antral cannula one could get, so to speak, a deep-sea fishing of the antral contents, whereas, with a Lichtwitz puncture it was open to the objection that if the amount of muco-pus was small it was impossible to say whether it had come from the antrum or the frontal or fronto-ethmoidal cells.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

April 17, 1914.

MR. RICHARD LAKE, *President, in the Chair.*

Temporo-sphenoidal Abscess.—H. L. Whale, F.R.C.S.—Female, aged eight. History: Three weeks left otorrhœa; two days drowsiness, for which she was brought to hospital. Vomited once, just before admission. Condition on admission: Affected side—meatus occupied by pus and a polypus. No mastoid signs. Marked ptosis. Slight dimness of edge of optic disc. Opposite side—paresis of orbicularis oris; marked dimming of edge of optic disc; both of these signs cleared up within a few days. Temperature 79° F., pulse 100; knee-jerks normal. Normal but sluggish caloric responses of labyrinths. Lumbar puncture: Fluid came out at first rapidly, but after a few seconds ceased entirely. It was neutral, non-reducing, and contained a few lymphocytes and no albumin. Operation: Radical mastoid. A little pus in antrum. Tegmen antri removed; dura bulged to the size of a cherry; no suggestion of pulsation. Dura incised; immediate pulsation and hernia. Temporo-sphenoidal lobe explored in all possible directions; no pus found. Temperature rose to 99° F.; child much better; urotropine given. Fourteenth day: Temperature rose, reaching 104° F. on seventeenth day, with no rigor or convulsion; no other signs or symptoms except repeated projectile vomiting. Lumbar puncture: fluid under pressure; considerable increase of lymphocytes and some polymorphonuclears; culture sterile. After puncture vomiting ceased; temperature became subnormal; drowsiness again steadily increased. Second operation, twenty-fourth day: About 2 dr. of offensive pus evacuated from temporo-sphenoidal lobe; diphtheroid organism, (?) Hoffmann's bacillus, in pure culture. Drainage by tracheotomy tube. Drowsiness passed into coma. Death on twenty-eighth day, after evacuating $\frac{1}{2}$ oz. of pus. Autopsy: A large gangrenous abscess occupied the whole length of under surface of temporo-sphenoidal lobe, measuring about $3\frac{1}{2}$ in. by $\frac{3}{4}$ in. by $\frac{3}{4}$ in.

Dr. DUNDAS GRANT said there were two interesting features about

the case: the presence of ptosis, indicating pressure on the third nerve by the temporo-sphenoidal abscess, and the paresis of the orbicularis oris on the opposite side, showing that there had been an overflowing of the trouble into the cortical centre for the opposite side of the face. This would indicate that the abscess was extending in a forward direction, and under such circumstances exploration would be more likely to succeed if directed rather forwards than directly above the tegmen.

Mr. WHALE, in reply, said that with regard to the exploring forwards, he did explore at least an inch in every direction, which was a good deal in this locality in a child aged eight, and he feared that if he went still further forward there would be risk of damaging the superior petrosal sinus.

Nerve Deafness associated with Anæmia.—Dan McKenzie.
—Female patient, aged forty-one; came to hospital a month ago complaining of deafness and tinnitus of three months' duration. The hearing tests showed slight nerve deafness. Vestibular reactions: Caloric—right ear, exaggerated responses; violent nystagmus in twenty seconds with extensive vertigo. Left ear, similar results. The patient's evident anæmia led to a blood examination, which resulted as follows: Red cells, 4,000,000; white cells, 3500. Differential count: Leucocytes, 60 per cent.; lymphocytes, 40 per cent.; oxyphiles, 2.5 per cent. Red cells: Poikilocytosis; no erythroblasts—*i. e.*, anæmia; leucopenia (Wyatt Wingrave). The urine showed a trace of sugar but no albumin. The patient shows the lemon tint characteristic of the severe anæmias, and her teeth are one and all carious and affected with severe pyorrhœa.

The PRESIDENT (Mr. Richard Lake) thought it would be of advantage to know whether the blood-pressure was observed, though knowledge was not yet very exact as to the meaning of alterations in the blood-pressure.

Dr. W. MILLIGAN thought it was difficult to diagnose nerve deafness as being due to anæmia, because the actual diagnostic points were few and far between.

Dr. A. A. GRAY asked whether the pyorrhœa might not be regarded as having a causative effect on the tinnitus and deafness. Apparently there was an association between anæmia and nerve deafness, as also between deafness and other forms of intoxication, including that from the teeth. It would be interesting to know whether the deafness improved with the anæmia.

Dr. DUNDAS GRANT asked whether the hearing was diminished for the highest-pitched tones, which was usual in cases of labyrinthine deafness in comparison with central deafness.

Dr. DAN MCKENZIE said, in reply, that he ought perhaps to apologise for bringing the case forward at such an early stage, as he had only seen the patient once so far. The hearing power for high-pitched tones was reduced; the optic discs were not examined, neither was the blood-pressure. Dr. Gray's suggestion as to the direct causative influence of the pyorrhœa was impossible of exclusion, but it was well known that the severer forms of pyorrhœa were frequently associated with profound anæmia, especially hæmolytic anæmia, a disease which had been specially investigated in connection with pyorrhœa.

Fracture of the Base of the Skull with an Unusual Appearance of the Drum observed some Months after the Injury.—E. D. Davis.

—A man, aged thirty-nine, sustained fracture of the base of the skull (diagnosis definite) on November 28, 1913. On March 12 last he came complaining of deafness, and stated that his doctor could see a piece of bone lying on the drum. Two small pieces of bone were removed from the meatus, and, on examination with a lens, one piece appeared to be like the head of the malleus, and the other like the two crura of the stapes, but there was nothing to prove that the fragments were pieces of those two ossicles and not fragments of the tegmen tympani. Deafness occurred after the injury, and is of the middle-ear type—Weber + ; no loss of bone-conduction. Politzer by catheter no improvement, no perforation sound. When last seen a piece of bone, like that of the handle of the malleus, projected from the upper part of the drum.

The PRESIDENT thought there was extreme redness of the fundus, so that one could not exactly define the various parts. In fractures of the base of the skull the malleus had been known to have been fractured.

Dr. W. MILLIGAN said it looked like a fracture of the malleus with some callus thrown out. He had seen one similar case of fracture of the malleus. A man was sitting under an apple tree, when he suddenly raised his head, and a twig of the tree went right down the external auditory meatus, without injuring the wall in its passage, and fractured the malleus. He saw the condition when the two segments were movable, and he also saw it later when there was a lump similar to that now seen in this case. These cases of fracture of the base of the skull were sometimes remarkable for the way in which the patients recovered. He had seen a patient who had had a very large rupture through the membrane, and a considerable quantity of brain-tissue had come through the external meatus: recovery was absolute and uninterrupted.

Mr. E. D. DAVIS replied that, so far as could be ascertained, the handle of the malleus lay in front of the spicule of bone. He agreed that now the ear was red, and it was difficult to differentiate the parts: a clearer view had been possible.

Tuberculosis of the Mastoid.—E. D. DAVIS.—In February, 1910, a boy, aged eleven months, came to hospital with a glandular abscess of the superficial parotid glands, and enlarged posterior auricular and upper deep cervical glands on the left side, left otorrhœa, and left facial paralysis. The parotid abscess was opened, curetted, and the posterior auricular and cervical glands were removed. June, 1910: A radical mastoid operation was performed, and more caseating cervical glands were removed. Finally, twelve months later, as the mastoid was still suppurating, the area was opened up and the large sequestrum shown was removed from behind the lateral sinus. The disease is now arrested and the result is shown.

Dr. JOHNSON HORNE regarded the case as a typical one of primary tuberculosis of the ear. The case presented features very characteristic; in fact, in his experience, pathognomonic of the primary as distinct from the secondary form of the disease. In the first place, the age of the patient was eleven months. Primary tuberculosis of the ear, in his experience, was a disease of child-life. Secondly, the remarkable enlargement of the adjacent lymphatic glands. The enlarged glands at times completely overshadowed the disease that led to their enlargement, with the result that the glands were removed and the disease left. The rôle of the lymphatic glands he had described as that of potential lines of defence, and also as that of potential paths of general invasion. Thirdly, the large size of the sequestrum removed from the temporal bone in

this case. As far back as 1903, in opening a discussion on this subject in the Otological Society of the United Kingdom, he had raised the question whether tuberculosis of the ear in child-life should be regarded strictly as a form of middle-ear disease, in precisely the same sense as other forms of suppurative otitis media, or whether it should not more properly be grouped under the tuberculous diseases of bone. All the clinical evidence—and more than a quarter of a century ago it was pointed out that facial paralysis in a child might be the first clue to tuberculous disease of the ear—supported the view that the disease had a deep-seated origin in the bone, and the extensive ravages found already to have been made by the disease when a case was first brought under observation confirmed that opinion.

Dr. DUNDAS GRANT thought that the course of events dwelt on in this case was particularly characteristic of early life; it was in young children with tuberculosis of the mastoid that one saw the separation of comparatively large sequestra, and in operating it was advisable to keep that well in view, and concentrate upon the sequesterum rather than on the carrying out of any set radical operation on the mastoid. There were various possible causes for the facial paralysis in this case: it might have been in the depth of the petrous bone, or near the sterno-mastoid foramen, or possibly it was due to involvement of the nerve in the tubercular process in the parotid lymphatic glands.

Mr. SOMERVILLE HASTINGS asked whether the tuberculosis in this case was primary. Most of the cases of tuberculous mastoid that he had seen were secondary to adenoids. He would like to know if adenoids had been present in this case, and if they existed now.

Dr. W. MILLIGAN asked whether this child was breast-fed, or whether it had been fed with a spoon, and, if so, whether any investigation had been made as to the source of the milk which was used. He agreed with Dr. Grant that in these tubercular children it was a mistake to do any set operation on the mastoid; all that was necessary was to remove the diseased bone, and follow up the various tracts of infection. He dissented from the view of Dr. Jobson Horne that the tuberculosis was primarily in the bone; he thought it was an infection of mucous membrane, and that the bone followed early. It was advisable, in connection with operations, to leave the glands for a time; they acted as a first line of defence, and hence served a useful purpose. Many of the glands were the result of septic infection. If any glands were found to be tuberculous they could be removed afterwards.

Mr. WHALE said that in a case of tuberculosis of this region, which he had under care, he decided to do first the bony part of the operation and leave the glands till later. But before healing of the mastoid set in all the glands broke down, and the result was a very bad neck, causing him to regret that he had not dealt with the glands immediately on making the diagnosis, so that the wound might perhaps have closed by primary intention.

Mr. E. D. DAVIS replied that when the child appeared at the hospital there was a huge parotid abscess and a mass of caseating glands at the lobe of the ear. Operation was done the same morning, as the glands were suppurating. The child was then given tuberculin in small doses, but it did not seem to make much difference. Later the radical mastoid operation was done, and subsequently, at a second operation, a large sequesterum was found at the posterior part of the mastoid process and behind the lateral sinus. After the removal of the large sequesterum the child did well. The good result was largely due to the mother, who

never missed bringing the child to hospital, and she bestowed great attention to the case. There were other children in the family, and she had fed them all at the breast until the tenth month of life. The child had adenoids. After it was clear that the mastoid operation was doing well, he removed a large adenoid growth and the tonsils. In the light of the subsequent history, it would have been better to have done the mastoid operation at first; but the child was obviously urgently ill with a large abscess.

Post-mortem Specimen of a Tuberculous Temporal Bone.¹—

E. D. Davis.—The patient had suffered for some years from pulmonary tuberculosis. During sanatorium treatment he developed mastoiditis and facial paralysis, following chronic otorrhœa. At the time of the radical mastoid operation he was suffering from advanced laryngeal and pulmonary tuberculosis. The mastoid process was extensively involved, and in removing the focus of disease a large area of the dura mater of the middle fossa was exposed. The post-aural wound healed by first intention, and the patient left the hospital after ten days with the symptoms relieved and health improved. When seen about six months before death, the mastoid cavity was satisfactory. The *post-mortem* showed extensive laryngeal, pulmonary, and intestinal tuberculosis. The middle fossa dura mater was thickened and the exposed area covered by tuberculous granulation tissue. The petrous bone below the dura and surrounding the opening made at the operation was necrosed. The brain was normal, and the meninges, apart from those in immediate relation to the area of operation, were unaffected.

Dr. JOHNSON HORNE, upon the histological evidence, regarded the case as one of secondary tuberculosis of the ear. It formed an instructive contrast with the previous case of primary tuberculosis of the ear. It brought out the interesting fact that whereas in the primary form of the disease children not uncommonly died from a diffuse tuberculous meningitis—part of a general infection and not a direct extension of the disease—in the secondary form of the disease the meninges, apart from the direct local infection, escaped. In this case, although *post-mortem* there was found extensive laryngeal, pulmonary and intestinal tuberculosis, the brain was normal, and the meninges, excepting those in immediate relation to the area of operation, were not affected.

Ossiculectomy.—**E. D. Davis.**—Man, aged thirty-six, with chronic attic suppuration of the left ear, treated by intra-tympanic syringing, etc., with no improvement, required a submucous resection, and, with the same anæsthetic, ossiculectomy was performed. The patient has arrested pulmonary tuberculosis.

Dr. DUNDAS GRANT said that in chronic attic suppuration, if it did not yield to syringing, as in this case, the question arose whether it should be treated by enlarging the attic opening and removing the outer wall of the attic; or whether it should be drained from below by removing the ossicles. In this decision the operator should be much influenced by the state of the tympanic membrane below and whether the ossicles were of any use for hearing purposes. In many instances of attic suppuration the hearing was very good. He asked as to the condition of the lower part of the membrane, and whether the ossicles appeared to be mobile.

On the other hand, he strongly advocated the removal of the ossicles when the membrane was destroyed to any great extent and hearing was much reduced, and when the ossicles were perhaps glued together and acting only as an obstruction to the escape of cholesteatomatous masses or other septic materials, which would wander into other channels if a free escape were not provided.

Dr. W. MILLIGAN thought ossiculectomy a disappointing operation. When disease was present in the attic it was invariably associated with disease in the antrum, and the proper course was to leave the lower part of the membrane and the ossicular chain alone to open into the antrum from the posterior wall. Then one obtained good results, because the supuration was arrested and good hearing ensued.

Dr. FITZGERALD POWELL said the ear was still suppurating. The mastoid operation would have been more satisfactory, and the hearing would have been as good as now.

Dr. JOBSON HORNE, speaking quite generally, expressed himself as opposed to intra-tympanic tinkering. Caseous ossicles meant suppurative disease in the attic, if not also in the antrum and the mastoid, and that disease could not be cured by removing the ossicles. Sooner or later the case came to a mastoid operation, and he preferred to do it in the first instance.

Dr. A. A. GRAY said he agreed with Dr. Milligan and Dr. Horne in reference to ordinary cases, but what would make him hesitate about the radical mastoid operation in this particular case was that the patient had arrested tuberculosis. If the tuberculosis were to become again active, possibly Mr. Davis might have been blamed for causing the recrudescence.

Mr. E. D. DAVIS replied that he had watched the case for twelve months. The patient was at Mount Vernon Hospital, and had arrested pulmonary tuberculosis. He had a discharge from the ear, and a forward perforation of the attic, with granulation tissue. He also had nasal symptoms, and required submucous resection. The hearing was not good. It was then decided to do ossiculectomy at the same time. The ear was operated upon six weeks ago, and until ten days ago was dry. At the end of a week it seemed to be doing very well, but when he saw the man three days ago there was some discharge and œdema of the mucous membrane of the tympanum. He did not care to perform the radical mastoid operation on a man who had arrested pulmonary tuberculosis, and who had no signs or symptoms of mastoid disease.

Post-mortem Specimen of Malignant Disease of the Ear.—
G. Stebbing and G. J. Jenkins.—The case described on February 20, as follows: Male, aged sixty-one. History: Patient first noticed swelling on right side of the neck, which appeared about two months ago, and about the same time, or soon afterwards, he noticed a change in the right side of the face. About a month ago the discharge and occasional bleeding from the right ear began. Some tinnitus since the onset, but deafness noticed only recently. Hoarseness two to three weeks. Dysphagia about ten days. Pain about two weeks. He had earache and discharge from the right ear when aged about twenty. No history of vertigo. Condition on examination: Patient has a swelling on the right side of the neck, involving the region of the lower part of the mastoid and extending downwards to the level of the thyroid cartilage, backwards to the posterior border of the sterno-mastoid muscle, and forwards to the angle of the jaw. Complete paralysis of the seventh

cranial nerve; eleventh and twelfth cranial nerves also paralysed. Soft, readily bleeding polypus showing at the orifice of the right external auditory meatus. The patient died about the middle of March. The specimen includes the temporal bone, pinna, Eustachian tube, part of pharynx, tongue, larynx, œsophagus and enlarged glands, all in one piece. The growth involves the middle fossa of the skull. Suggestions are invited as to how to make the best use of such a specimen.

The PRESIDENT said he would be inclined to make a longitudinal section of it.

Dr. JOBSON HORNE considered that it would be as well for the present to mount the specimen as a whole by the formalin method and to defer the cutting of it until the special points to be investigated had been decided upon.

Dr. W. MILLIGAN said he would cut it obliquely from the meatus through the petrous bone to the apex; he would have the two sides so mounted that one could see the growth in the external ear, and the invasion of the middle ear and middle fossa.

Dr. A. A. GRAY said that before cutting sections he would decalcify, and then do the cutting with a very sharp, large microtome knife, making the serial sections $\frac{1}{4}$ in. thick, preserving them in formalin or glycerine, with a black background. However carefully done, sawing through distorted the parts to some degree, and the use of a sharp microtome knife would be better.

Mr. SOMERVILLE HASTINGS said he hoped that whatever Mr. Jenkins did he would show, later, microscopic sections of the growth. He would like to know from what part of the aural tract the growth was thought to have sprung originally.

Mr. JENKINS replied that he could make microscopical sections of the whole of that temporal bone, and the pinna, but if he did that, he would like to know whether there was any particular direction in which he should cut the sections. He did not know what was the nature of the new growth. The small size of the malignant polypus with very extensive involvement of deeper structure, including the middle fossa and glands of the neck, were very striking. These cases were often operated upon for enlarged glands rather than for malignant disease of the ear. This specimen pressed home the lesson that if there were glands which appeared to be malignant the ear should be carefully examined.

Hæmatoma Auris.—G. J. Jenkins.—This patient was exhibited at the meeting on January 16, and the members requested that she should be shown at a later date. The operation was done on December 20, the day following the injury.

The PRESIDENT said he thought it was tending towards a very excellent result. He suggested a course of X-ray applications to get rid of the hyperæmic condition remaining.

Dr. FITZGERALD POWELL asked what was the method of dealing with the hæmatoma.

Mr. JENKINS, in reply, said an incision was made in front of the helix, and a clot which was lying external to the cartilage turned out. This clot extended well into the meatus. He returned the flap into position, and tried to retain it there. It would be seen now, on careful examination, that there was a slight malposition of the perichondrium, but he thought the result justified the procedure. In some cases possibly the method would not answer so well.

Demonstration of Microscopical Specimens.—G. J. Jenkins.—(a)

Otosclerosis: Serial Microscopic Sections of the Left Temporal Bone of a Female, aged fifty-nine, showing Ankylosis of the Stapes and other Changes in the region of the Foramen Ovale.—The patient on the left side was able to hear only "loud shouting" in the ear: she could not distinguish any words. The specimen was removed about ten hours after death, and fixed in formalin in normal saline solution. The specimen was decalcified by the formalin and nitric acid method, described at a previous meeting, and embedded in celloidin. The sections were made transverse to the long axis of the petrous portion of the bone, and cut $12.5\ \mu$ in thickness. Every second section from the modiolus to the vertical part of the seventh nerve had been mounted. The sections were stained in a variety of ways—hæmatoxylin and orange G., Mallory and Van Gieson, iron hæmatoxylin. A series of sections were demonstrated under the microscope and by the epidiascope. An obvious feature in the series was the complete replacement of the stapes and surrounding bone by a new bone formation. The new bone representing the stapes was completely ankylosed or fused with the surrounding bone anteriorly, superiorly or posteriorly. There was an indication, at parts, of the original joint inferiorly. This new bone formation was very different from that found normally in these situations. It was cancellous in type, with large medullary spaces containing cells of a variety of forms. The most interesting feature of this part were the *large giant cells* in the mass representing the stapes. These giant cells contained five to twelve nuclei, had a protoplasm that stained strongly, and a well-defined outline. The nuclei were irregularly arranged usually, but in many cases they were peripheral. Mr. Jenkins had not seen giant cells of this type before in any condition, and had not heard of them being described in otosclerosis. Other features he thought worth noting were the diminution in size of the foramen ovale, the great thickness of the mass replacing the stapes, and the thickening of the margin of the foramen. He had not been able to detect any changes in the bone in any other part than in the immediate neighbourhood of the foramen ovale. The regions of the foramen rotundum and interossicular joints seemed normal.

(b) Acute Mastoiditis, Septic Labyrinthitis and Facial Paralysis: Serial Microscopic Sections of the Mastoid, Labyrinth and Middle-ear Tract of the Temporal Bone of a Male, aged thirty-two.—The patient was admitted into an institution seriously ill with phthisis, and also suffering from deafness and otorrhœa in the left ear. A complete clinical examination was impossible. About ten days before death he was said to have had more trouble in the ear, and developed facial paralysis on that side. The specimen was removed about fourteen hours after death, and fixed in formalin and normal saline solution. It was decalcified by the formalin and nitric acid method, and embedded in celloidin. The sections were cut $15\ \mu$ in thickness in the coronal plane. The sections through the mastoid and antrum showed pus in the antrum, with loss of lining membrane of the space. The mastoid was of the infantile (dense) type, and the fine medullary spaces infero-external to the antrum showed a marked leucocytosis. The leucocytosis extended into the canal of the seventh nerve as low as and into the canal for the chorda tympani nerve. Masses of leucocytes in the perilymphatic space of the external posterior and superior canals, and fibrinous deposits in the endo-lymphatic spaces of these canals. Sections farther forward showed total loss of the tympanic membrane, malleus, and incus. There were small sequestra in various parts, lying in pus. The tympanic wall of the

Aqueductus Fallopii was sequestered in many places, and the canal contained pus. In the region of the foramen ovale the bone exhibited all the appearance of otosclerosis, and a stream of pus could be detected between the stapes and margin of the foramen. The vestibule was filled with pus. The endo-lymphatic space contained a few leucocytes, and was filled with fibrinous material. There was a fistula of the promontory, and a pus stream could be seen between cochlea and the middle ear. The membrane of the foramen rotundum persisted only at the inner part, elsewhere it was destroyed, and the cochlea laid open into the middle ear.

Dr. A. A. GRAY said that with regard to the presence of giant cells in otosclerosis, the giant cells were there in Dr. Jenkins's case, and the question was as to where they came from, and what their presence meant. Manasse said that the osteoclasts were not active in otosclerosis—*i.e.*, the old bone which had to be absorbed in order to make room for the new formation of bone was not absorbed by osteoclasts—and Manasse did not admit that they were absorbed by cells at all, but said the absorption was brought about by simple pressure. That seemed an extraordinary statement coming from such a careful histologist as Manasse. Bone could not be absorbed by pressure, one could not press the calcareous particles into a lymph space or blood-vessel. It could only be done by cell activity, by the cells taking up the material round about them. He thought the giant cells which Mr. Jenkins showed were the active agents in absorbing the bone. He believed them to be osteoclasts, but not following the usual distribution of osteoclasts in ordinary bone. As to where the osteoclasts originally came from, even in normal bone, he believed they came from the smaller blood-vessels, and that the giant cells in otosclerosis and normal osteoclasts were originally one and the same thing. With regard to the occurrence of suppuration in otosclerosis, Mr. Jenkins pointed out a portion of the posterior margin of the oval window, in which he said suppuration apparently occurred in a patient with otosclerosis. The more he (the speaker) had studied these cases the more he had concluded that suppuration in the ear might be a cause of otosclerosis, but that did not mean necessarily that nerve conditions were unassociated with it. He thought there must be some inherent tendency in these people, and, given that tendency, the same change might be produced as occurred in otosclerosis without suppuration. Even where the whole membrane was destroyed some patients became almost stone deaf, whereas others were only slightly affected.

Mr. JENKINS had not studied the point raised by Dr. Gray as to whether the suppuration was causative of the change in the foramen ovale, or whether it was an accidental association of otosclerosis with chronic suppuration. The latter was the view he leaned to. With regard to giant cell formation in otosclerosis, he did not think these giant cells were similar to any he had previously seen, but they appeared in these cases to be taking on the function of osteoblasts; they seemed to fit into the various rarefied spaces of bone.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

April 3, 1914.

DR. D. R. PATERSON, *President of the Section, in the Chair.*

DISCUSSION ON THE INTRANASAL TREATMENT OF FRONTAL SINUS.

(I) Introductory Paper by P. Watson-Williams, M.D.¹

Case of the "Incomplete" Operation: Subacute Case, with Nose too narrow for Inspection of Operation Field; Operation at one Sitting; General Anæsthesia.—P. Watson-Williams.—Male. Had suffered from right supra-orbital neuralgia during December, 1913; pus seen in middle meatus far back, at times cacosmia. Right antral exploration with suction syringe yielded pus. Skiagram showed right frontal sinus blurred. Right antral intranasal operation, with partial removal of posterior border of nasal process as it encroached on and narrowed the nasal passage. Anterior entry of right frontal sinus by removal of fronto-ethmoidal cells enabled a 6 mm. thick bougie to enter freely. Antral pus film, G. P. streptococci; some phagocytosis. Antral pus culture, G. P. streptococci; no staphylococci. At the time of operation 50 c.c. of anti-streptococcic serum were injected. Sensitized streptococcal vaccines (autogenous) followed, dosage 75 millions up to 450 millions. Discharge almost ceased. No headaches since the operation. The patient can pass a bougie into the sinus and lavage himself.

Case of "Complete" Operation: Chronic Frontal Sinus Suppuration.—P. Watson-Williams.—Male, aged thirty. Subject to left supra-orbital headaches for many years, but two years ago they became very severe, and then were relieved by discharges of pus. Recurrences ever since, usually once a week or so. His left antrum was opened and drained in 1912. On March 16, 1914, nothing larger than a 2 mm. cannula would enter his left frontal sinus. Anterior entry and removal of fronto-ethmoidal cells allowed admission of a No. 19 (6 mm.) bougie. On March 18 the crista nasalis burred, so that a No. 19–25 bougie entered (8 mm. by 6 mm.). No headaches since the operations on the frontal sinus, both under cocaine anæsthesia. Since the operation slight curettage of sinus, lavage and injection of collusol argenteum. The 6 mm. bougie entered and withdrawn several times during the meeting. The patient can pass a frontal sinus cannula and lavage himself.

(II) Introductory Paper by Herbert Tilley, F.R.C.S.²

Sir STCLAIR THOMSON was reminded that it went without saying that all these researches on the frontal sinus should be confirmed by X-rays. It seemed to him only the other day that he (the speaker) presented some radiographs to the old Society, to show that no one could be positive that a probe or cannula was in the frontal sinus for the first time, unless

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., May, 1914, p. 225.² See JOURN. OF LARYNGOL., RHINOL., AND OTOL., May, 1914, p. 242.

it was confirmed by the radiograph. Some of the photographs exhibited showed that Dr. Watson-Williams was not in the frontal sinus, but in those cells which he (the speaker) many years ago called the orbito-ethmoidal cells, a term which had since been adopted, and was expressive. He was reminded of a remark attributed to Charles Lamb, that whenever a new book came out he always read an old one! When these new operations were brought forward he (the speaker) turned his thoughts to former external work on the frontal sinus. He confessed that he would feel much less nervous to-morrow in operating on a frontal sinus by the external method than by blindly using a burr or similar instruments inside the sinus itself. Perhaps that feeling might change with experience. Last time he was in Paris he asked Dr. Luc if he always thought it his duty to tell every patient he was about to operate upon that the external operation was a very serious one, and his reply was that he did not think it necessary since he had adopted the complete Killian method, for he thought it no more risky than any operation on a septic nose. He was also recently in Berlin, and found that Professor Killian now did fewer external operations on the frontal sinus, and in a clinic of some 15,000 new cases every year he only used the external method in six to ten cases. Killian had also been studying the internal route. Four weeks ago he saw the operation done by Max Halle. Halle turned down a flap and chiselled away part of the ascending process of the superior maxilla, so as to get at Mosher's agger cells. These he broke down sufficiently to pass Ritter's probes. Having done that, he came to what he (the speaker) regarded as the alarming part of the performance; he took the last of the three sizes of burr shown by Dr. Watson-Williams, and got it into the sinus before making it rotate, and he rotated it as he brought it out, and in that way he claimed to get down the crista nasalis. This method could not succeed in every case, owing to the anatomical diversities in the human body, and these were so common that the operator must be prepared for disappointments.

Into the orbito-ethmoidal cell of a skull the speaker had passed some black worsted. The cell could be seen to spread over the top of the orbit, and there was no communication between it and the frontal sinus. One might operate on the sinus successfully, without relieving the patient of a lot of nasal suppuration, and possible headache, from not knowing that there was this configuration, whereas when operating by the external method one was more likely to expose it. He asked members to note the very narrow fronto-nasal duct, and see the dangers that would be run from putting a rotating burr through it.

Coming to results, there could be no doubt that this internal route had a great future, particularly in women, who, quite naturally, would not consent to external defacement. But there would always remain the possibility of reinfection, and therefore the important question arose, Was it safer? His own feeling was that he had now little hesitation in recommending the external operation, although disasters would come at odd times, and he had published his—all in pioneer days. Luc had several disasters at first, but he had not now had any for a long time; neither had Mr. Tilley, nor he (the speaker). Still, he often quoted Killian's experience: he operated eighty-six times on the frontal sinus without a fatality, but before reaching his hundredth case he had had three deaths, one of which was from dammed-up pus in an undiagnosed sphenoidal sinus, another plea for making a very complete diagnosis before starting to operate. Those who were thinking of this operation should limit their attentions at first to the approach to the frontal sinus.

Dr. DAN McKENZIE said that perhaps the whole problem had not been dealt with in the manner in which it was troubling some minds. It was necessary to settle in what type of case the internal operation should be done, and when the external should be chosen. He, with the last speaker, would use caution before adopting the internal operation, which he thought was regarded by many as secondary in safety and in position. The swing of the pendulum in favour of radical operation three years ago was now at the opposite extreme, and there was too much tendency to operate intranasally. There were cases in which the internal operation would be perilous to the patient, and he knew of no method—not even X-ray examination—by which one could be quite certain of the anatomy before operating. If the intranasal operation were adopted in a general and enthusiastic manner, he felt convinced that many cases of disaster would be encountered. Certainly operating by this route should be done with the eyes wide open to its risks and dangers.

Dr. E. A. PETERS had shown two cases operated upon by the method, and he did not doubt that there was much to recommend it over the external operation, but there were some points which he was not clear about. In another case operated upon one side which had discharged spicules of bone was dealt with by the external, and the other by the internal method. On the first side the mucous membrane was polypoid, and he wondered if such a condition could subside when the intranasal operation route were chosen. With regard to the probe which was used, both before the cutting operation was commenced and during the operation, to locate the position of the canal, it was useful to have its last eighth of an inch rather sharply bent. In a narrow nose he obtained an excellent approach by cutting vertically through the septum and working from the other side; he could then see into the cells, especially by using a Hartmann's speculum. The patients he showed were operated upon by a procedure which occupied only twenty minutes. He first cut off the anterior edge of the middle turbinal by small Luc's forceps, and then followed with a probe. In a short time he could pass a Good's raspatory, and then cut downwards through the agger cells if present. It was necessary to avoid using much pressure, and to do the cutting from above downwards and outwards. He did not think the method would be so good when polypi and carious bone were present.

Mr. J. P. I. HARTY had performed the operation just described, and had been very pleased with it, and with the ease with which it was done. In most of the cases he had done it under local anæsthesia. The entry was easily made and the washing-out was easy, but the difficulty was as to when the suppuration would stop. In some cases which he had kept under observation the suppuration had persisted for some months, though the headache and other symptoms had been relieved.

Dr. DONELAN had just been asked how many cases of chronic frontal sinus suppuration really needed operation. For his part he thought he did not see more than about twenty-five of such in a year, and many of them were perambulatory cases going to various hospitals. In chronic frontal suppuration he thought we had all been doing for years the most legitimate internal treatment. We had all removed the anterior end of the middle turbinal, and if we did not distinctly recognise the anatomical importance of the agger cell, if such really exist, one went through them with the forceps, and cleared upwards and outwards through the ethmoid as far as possible. Where this had not sufficed, he had always opened the inner end of the frontal sinus by an external incision. The ingenious drills shown on this occasion were all for the purpose of removing in

more or less dangerous ways the obstruction caused by the nasal crest. He thought it could be much more safely removed by means of a curved chisel externally, and the advantage on the score of safety was so great that he thought this method was superior to any other. He must admit that in the great majority of the cases so operated by him, on inspection of the cavity and the use of a flexible probe through the small opening, it was decided to undertake the obliteration of the sinus. It was unnecessary to insist on the importance of this direct examination of the interior. Mr. Tilley had himself admitted in his paper that even when one had succeeded in entering the cavity by an exclusively internal route, the operator did not know where he was, pathologically speaking, for one could not know what was taking place round the corner. He could refer to only very few cases that really needed operation in which this combined method had been successful, and he was of opinion that if what he called the legitimate internal treatment were not successful, and the patient continued to complain of pain, the radical external operation should be performed.

Mr. HOPE said that a short time ago Sir StClair Thomson and he had a look at some specimens of skulls, and he was sure that in some of them there was not more than 4 mm. of safety in the region where Dr. Watson-Williams said there was usually a space of 9 mm.; hence there would have been danger if this operation were done on such. He asked what means there was for determining the depth of the sinus.

Mr. HOWARTH agreed as to the need of the surgeon having, in order to do this operation, a clear grasp of the anatomy of this region. That had been placed on a more satisfactory footing by the paper of Dr. Mosher, and his own examination of many skulls and *post-mortem* preparations had brought him to the same general conclusion as to the opening of the fronto-nasal duct and its relationship to the ethmoidal cells. Since Mosher published his paper, that authority had come to the opinion that the "agger nasi" cells were not present so frequently as he was at first led to suppose. It seemed to the speaker that one reason why Mosher's point of entry was a good one was that it was above the region of the agger nasi, and the ethmoid was entered by going through the middle turbinate itself. He believed that Mosher did not now lay particular stress on the preservation of the middle turbinate. He (the speaker) did not think that the internal operation could be applicable to all cases because of the varying anatomical configuration of the fronto-nasal duct. In those cases where the frontal sinus was developed from the third frontal groove in the frontal recess, the fronto-nasal duct was placed external to the infundibulum and opened into it obliquely. He had seen specimens where the fronto-nasal duct had been going down external to the whole ethmoid labyrinth, and it could not be safe to approach these by the internal method. The operation certainly had a great future, but he agreed with Dr. McKenzie that it would be necessary to choose with care the patients for submission to it. As regards his own procedure, he had not as yet been courageous enough to use the burr or raspatory to remove the nasal crest, but had followed Mosher's procedure and worked rather from behind forward. He thought that this gave a better approach to the ethmoid than the anterior method, as in the latter, unless agger cells were present, one was apt to come up against the ascending process of the superior maxilla, and did not readily enter the ethmoid labyrinth, and to enter the frontal sinus one must often burr off the nasal crest. By going in further up one was more liable to enter the ethmoid labyrinth, and so get at the fronto-nasal duct. He thought

that one reason the operation was so successful was that in approaching the frontal sinus co-existing ethmoiditis had to be dealt with.

Mr. W. STUART-LOW said he had listened with great interest and instruction to the addresses and demonstrations. He agreed with Mr. Tilley that whether this operation was accepted or not largely turned on the anatomy. On the score of anatomy alone he had no hesitation in rejecting such procedure as this operation as unsurgical; it was impossible to know the exact anatomy, and the variations of these parts were so great that to do as suggested and push burrs and bougies about in this region was, in his opinion, reprehensible. He had shown many successful cases where a combined operation had been performed, the intranasal preparation for the Ogston's external method first being done, the middle turbinal being entirely removed, and thus free drainage from below established as a preliminary to the Ogston operation. By the external operation every step could be observed and the sinus thoroughly cleared of polypi, and a thickened pyogenic lining scraped away. He agreed with Dr. Peters in considering that it would be impossible to remove polypi through a small opening into the nose from below, as suggested in this new method. He would not adopt what he would characterise as blindfold surgery.

Dr. CATHCART considered the present meeting an epoch-making one in the Society, as it was held for the discussion of an operation, which had been done a good deal on the Continent and in America, and of which the pioneers in this country were Dr. Watson-Williams and Mr. Tilley. As a rule, a new method of operation is suggested in order to obviate the dangers of the old one, and it must be remembered that the introducers of this discussion were also pioneers of the old operation; hence it was not likely that they would take up with the new, the intranasal, operation unless they felt there was less danger from it than from the old one. The attitude of Dr. Dan McKenzie was well illustrated in the seventeenth century, when in Paris there was a celebrated friar who cut for stone so successfully that the Paris surgeons had him educated in anatomy. This taught him the dangerous region he had cut into, with the result that he was afraid to operate again. If operators were only to have in mind all the supposed dangers, no new operation would be devised or done. He had seen Dr. Watson-Williams operate, and what struck him was that the operation was done by the feel of the end of the forceps. In fact, in one case the septum was so deflected that it was not possible to see the middle turbinate bone. In the olden days the operation on the maxillary antrum was always done from the outside, because it was said the operator must see what was going on. It was now far more often done from the inside, and the success was no less great. The chief point to be emphasised was that each one, before trying the intranasal operation, should practise it on the cadaver. Anatomical variations were as likely to be met with in the intranasal as in the extranasal operation.

Dr. FITZGERALD POWELL said that for his part he would certainly keep an open mind and would not form conclusions as to the utility and dangers of the operation until his experience warranted it. In the past Mr. Tilley had been a strong supporter of the external radical operation, and he (Dr. FitzGerald Powell) had learned a good deal about frontal sinus treatment from him, and had seen a number of Mr. Tilley's cases which had been treated by the external method and had been successful, and he could not quite understand Mr. Tilley's statement that for two years he had not treated a single case by the external method.

Dr. Watson-Williams, in his excellent work on "Rhinology," published in 1910, expressed himself as strongly opposed to the internasal method, which he now advocated—going so far as to say that, even if there was no danger in this operation, it was not so good a one as the external operation—and he could only conclude that with more experience of the "internasal" operation he had changed his opinion in regard to it. Consequently, he would advise the members, with Dr. Watson-Williams' experience before them, to defer their judgment until a more extended knowledge of results was obtained. There were certain cases in which he thought the internasal method could not be applicable—viz., where there were indications of diseased bone in the sinus, in cases of external fistulæ, bulging of the walls of the sinus, and, as in Mr. Tilley's case, where "loculi" were found in the sinus. In these cases he had always found that an external operation was required. In cases in which the foregoing conditions did not exist, he had been well satisfied by the results of removal of the anterior half of the middle turbinate bones, and, if necessary, the curetting of the ethmoid cells and washing out of the sinus. In one case he remembered there was complete recovery in six or eight weeks in this way, washing out the sinus three times a week. In doing the external operation experience had taught him to avoid extensive operations on the bony walls of the sinus. By opening through the floor and lower part of the anterior wall of the sinus he was enabled to explore the sinus and enlarge the passage into the nose, having previously removed the middle turbinate; in this way he got free drainage and cure of the disease.

Dr. H. J. DAVIS said he had always felt reticent about doing resection of the septum in suppurating noses, because of the possibility of infection. He had seen instances where, after this had been done, the septum sloughed away. He (the speaker) had operated upon fifteen, and he thought Mosher, in leaving the middle turbinal, meant it to be a landmark. By keeping external to this the cribriform plate could not be damaged. The position of the agger nasi cells varied in different skulls. The best way to get into them was to put the finger on to the lacrymal bone, pass a small Volekman spoon into the nose, and try to hit off one's finger with the spoon. If one was low down, the spoon could not penetrate; but if one was over the exact spot penetration was easy, and under cocaine one could pass a frontal sinus cannula. In washing sinuses out, tincture of iodine had a very rapid effect; hydrogen peroxide and other lotions were not, in his opinion, so efficacious. The reason that some cases which had the radical operation done did not do well was that the operator wanted to do too much and did not know when to stop. He had had two cases of death after the external operation, the skull and brain of one of which was shown before the Section two years ago. He had operated upon this man twice intranasally, but he worried to be taken into hospital again for constant pain, and he was operated upon externally by Killian's operation. An abscess in the frontal lobe was opened and drained, but the patient, a man, aged thirty, died of basal meningitis. The abscess in the frontal lobe had evidently been the cause of the incessant headaches.

Mr. NORMAN PATTERSON felt particularly interested in Dr. Peters' remark about an incision through the septum. For some considerable time past he had been trying a method of operating through the septum from the other side of the nose. After performing a submucous resection in the ordinary way, he made an incision through the muco-

perichondrium, on the opposite side, parallel to the original incision and half an inch behind it. One could work through the gap thus made by using a StClair Thomson speculum. In this way an excellent view was obtained of the ethmoidal region. Recently he operated on a case in which a fortnight previously he had done a submucous resection. In this case both ethmoids were diseased, and he made an oblique incision through the septum and with comparative ease he dealt with the disease on both sides. Afterwards he inserted stitches into the septal incision and union was perfect. The further forward in the nose the disease the better the view. He thought this method would be useful in frontal sinus cases. He had found it of use in sphenoidal sinus disease.

The CHAIRMAN (Dr. Hill), in summing up the debate, said that, as far as he could gather, the majority of the members of the Section had come prepared to "damn with faint praise" the pre-nasal treatment of long-established frontal sinusitis in spite of the perusal of the papers of introducers. Many, no doubt, were still impressed by the *à priori* objections which had been so lucidly summarised by Sir StClair Thomson, more especially as regards the dealing blindly with hard bone in a dangerous area in the later stage of the operation and the limited nature of the surgical measures which it was possible to carry out on the diseased mucosa, compared with what could be done by the external obliterating operation. If mere, but efficient, drainage and irrigation through an enlarged infundibulum were really proved to be a curative measure in itself in many cases, then the minor operation of enlarging the fronto-nasal canal, by a small external incision at the inner angle of the orbit, as advocated by Dr. Donelan, would effect this without running the possible risk of perforating the cribriform plate or the internal table. Mr. Howarth and others were satisfied with the old per-nasal method—namely, of removing part of the turbinal, followed by breaking down the bulla and the cells above, and then inserting the bent metal sound in an upward and forward direction through the ostium; when this could be carried out, as it sometimes could rather easily, this more posterior route had the advantage over the more anterior one in that the hard bone of the nasal process and the crista had not to be dealt with, more or less in the dark, by formidable instruments; on the other hand, the operative field was in dangerous proximity to the cribriform plate, and one could not look straight into the sinus from the anterior naris, as was possible in cases shown that afternoon. The cross (×) in Mosher's diagram, which had been shown on the screen by each of the introducers, was situated over the cells immediately posterior to the fronto-nasal duct, the cells which Mr. Howarth and others still opened in some cases, according to the old posterior method, and this diagram in Mosher's paper dealing with the agger cells and the more anterior route had led to great confusion, and had probably been inserted in the wrong place; at all events, the cross was in the wrong place in the diagram if intended to indicate the point of penetration in the agger route. He (the speaker) did not think there was any mystery about these agger cells; they were, he had always understood, the maxillo-ethmoidal cells of the text-books. Two speakers only, Dr. Peters and Mr. Harty, had actually performed operations of the new type advocated by Dr. Williams and Mr. Tilley, and it was significant that whilst they both gave the method their support, those who had raised objections had not referred to any personal experiences of their own. Dr. Cathcart had called attention to a somewhat disconcerting fact, which probably many of them had in their minds—namely, that the advocates of the new per-nasal operation

were amongst the most experienced and expert exponents in this country of the external radical operative methods, and yet they now came forward and stated, as the result of their recent considerable experience, that as far as they are concerned the per-nasal operation is the operation of choice in an ordinary uncomplicated case of chronic frontal sinusitis. Such a deliberate pronouncement cannot be ignored coming from such authorities. The method of operating adopted by each is similar in principle and differing only slightly in detail. His (Dr. Hill's) own experience had been limited to the passage of a frontal sinus cannula in a few acute cases, and in chronic cases with acute exacerbation he had occasionally removed the anterior extremity of the middle turbinal and passed a metal sound into the sinus if it would go up easily; and it was a curious fact that it often does go up easily in chronic frontal sinusitis. He had not, however, systematically washed out the sinus, nor had he ever attempted this new Ingals-Good type of operation. If, in the future, he (the speaker) came across a case in which he could easily pass a fairly large sound into the frontal sinus after the old method, he was inclined to think he would not really be running much risk in using Dr. Watson-Williams's drill with guarded burr to enlarge the opening forward.

The discussion had been a most instructive one, and showed that, in the expert hands of the introducers of this discussion, the newer per-nasal procedures advocated were safe and usually effectual; and in view of the equally satisfactory reports from abroad from an increasing number of adherents, those who had up to now been accustomed to rely almost entirely on external operations would probably feel that it was at least incumbent on them to seriously reconsider their attitude towards this question.

Dr. WATSON-WILLIAMS, in reply, said he was sorry to have given the impression that he had taken up the intranasal route to the exclusion of the external operation; that was not so. The intranasal method, however good, had its limitations, and it was not suitable in a small percentage of cases. For such he had himself devised an external operation and found it very satisfactory. All he contended was, that by employing in the intranasal operation the methods of anterior entry, the sphere of usefulness of the intranasal operation would be much increased. Sir StClair Thomson referred to some of the skiagrams he had exhibited as showing the bougie in the orbito-ethmoidal cells, but that was an optical illusion. Those skiagrams were to show that the 6 mm. thick bougies were carried back by the nasal crest so as to lie against the tabula interna (the swan-head bougies had a thin neck, so the lower part did not push the tip back so much), and that for the same reason it was most dangerous to use unguarded burrs or chisels in this region. Other skiagrams showed that after removing the nasal crest one could pass the instrument straight up well into the frontal sinus. Mr. Howarth had suggested that the forceps might impinge against the frontal process of the superior maxilla, but in practice he would find that it was not so. Often agger cells were not present. Like himself, Vacher and others removed these cells long before Mosher's paper at Liverpool emphasized their importance, and helped us in so many ways by his work. Dr. Dan McKenzie appeared to be afraid of the new method, yet not so long ago he (the speaker) shared all those fears, till actual experience gradually dispelled his anxiety, and he thought his methods removed all dangers. By going through the anti-conchal cells one was in front of the cribriform plate, and the latter could not be endangered until one got further back.

In answer to Dr. Peters' question as to how a case with polypi

should be dealt with, Dr. Watson-Williams stated he had shown a specimen with an enormous number of polypi in the frontal sinus. There was a large fronto-nasal duct, and there were no symptoms because of the size of that duct. If one irritated Nature by making a large opening there was rarely trouble from polypi in the sinus.

He could not agree with Mr. Tilley in some of the points he had emphasised in his paper. Mr. Tilley said that when acute symptoms persisted in spite of palliative measures or of mere anterior middle turbinectomy allowing of no effectual lavage, and especially when swelling and œdema appeared in the eyelids and in the soft tissues over the sinus, external operation would be called for, but he (Dr. Watson-Williams) found that the more acute cases were most responsive to intranasal operation, and clearance of the anti-conchal and fronto-ethmoidal cells should at least be tried, despite the presence of the symptoms mentioned, provided, of course, there was nothing worse. Even the occurrence of subperiosteal orbital abscess did not contra-indicate intranasal operation, and there were cases on record where opening the ethmoid cells relieved such a severe orbital complication. Mr. Tilley further mentioned, among the conditions which should influence operators in selecting external methods of operation, (a) when the sinus ostium was situated above the level of the cribriform plate, and when the posterior wall was so low as to closely overhang the ostium. To this the speaker replied that the sinus ostium was usually as high as, and very often higher than, the level of the cribriform plate, and he would consider that the higher the ostium the less the risk to the cribriform plate from the intranasal operation with retention of the middle turbinal plate intact, while the fact that the tabula interna overhung the ostium could not be detected by a skiagram, but if one avoided all gouges, chisels, and unguarded burrs there were no undue risks. Mosher's method of entry, which was followed by Mr. Tilley, he should consider unsafe.

With regard to his case, which subsequently died, Professor Walker Hall's, the pathologist, report showed that the frontal sinus operation had nothing to do with the death; there was no meningitis, death having been due to cellulitis of the leg and pyæmia. Still, he had thought it right to bring the facts forward.

With reference to the question of Dr. H. J. Davis, Dr. Watson-Williams considered it was better if possible to postpone operations on a deflected septum, which, except in extreme deformity, did not prevent removal of the anterior ethmoidal cells and entry to the frontal sinus.

Mr. Hope was mistaken in saying that he (Dr. Watson-Williams) had spoken of 9 mm. space as usual, and pointed out that 6 mm. was the maximum, often only 4 mm. was safely available.

Mr. HERBERT TILLEY, in reply, said he joined issue with Sir StClair Thomson as to the specimen he had shown; if the cells were removed, which had been referred to in the opening papers, one could drain the fronto-ethmoidal cell in the specimen, which Sir StClair Thomson said could only be attacked by the external operation. In answer to Dr. Peters' question as to polypi in the sinus he had referred to the treatment of this condition in his paper. When there was polypoid degeneration in a sinus, by irrigating and injecting warm air, and then injecting iodine or nitrate of silver, one reduced the villous condition of the mucous membrane, and little was secreted except pure mucus.

Dr. Donelan said the operator did not know where he was when operating by the intranasal method, but his (the speaker's) reply was that he knew where he was if he set out to master the anatomy of the

parts and worked in the way which had been described in the opening paper. By removing the anterior cells one found oneself in a large cavity (the frontal sinus), and free drainage was provided from the lower end of that cavity. If there was much bleeding, and one put in strips of gauze moistened with cocaine and adrenalin, it was surprising how much one could see.

In answer to Mr. Hope, he did not bother about the depth of the sinus in the intranasal operation. On the contrary, with the external operation one would have a deep sinus and scar, and possibly a dead space, which could not be obliterated. In that kind of case the intranasal operation was a great advantage. The external operation implied disfigurement, and some six weeks' treatment, with dressing every day. These considerations had done much to determine his preference for the interior operation. Two days ago in London he operated upon a man by the intranasal method; he had double frontal sinus suppuration. That day he went to wash him out, and he asked whether he could go out within the week (three days after the operation), as he had now no headaches. Such an event was unthinkable with the old operation.

With regard to Mr. Low's combined operation he had had no experience of it.

Concerning the danger of the intranasal operation suggested by Dr. Cathcart, unfortunate cases were sure to be heard of, but the intending operator by this method should be well up in the anatomy of the part, and practise the operation on a few skulls first.

With reference to the necrosis of the frontal sinus walls, for two years he had not had such a case, and in such an event it would be recognisable by external symptoms. If such were present he would do the external operation, or for ocular or meningeal symptoms, or the escape of pus into the orbit. He thought that the majority of cases of chronic frontal sinus suppuration with polypi in the nose would be satisfactorily dealt with in the future by the intranasal method, while a minority would have to be treated by the external operation—*i. e.* a reversal of the old procedure.

Abstracts.

NOSE.

Simpson, W. Likely.—**A Method of Closing Perforations of the Septum of Nose.** "Journal of the American Medical Association," July 4, 1914.

For the closure of a perforation of the septum Simpson advises a submucous operation with a transplantation of cartilage or bone, or both, to the site of the perforation, and a sewing of the overlying flaps. The transplant gives a support in place of attachment for the flaps of mucous membrane, thus avoiding contraction, which would otherwise occur.

His technique is as follows: Elevate the mucous membrane, as in an ordinary submucous operation, from the cartilage and bone, both anteriorly and posteriorly to the perforation, the edges of which must be pared. The bone and cartilage are then resected and placed in normal salt solution till required. The larger the transplant the better, and if a suitable piece cannot be obtained from the patient, one may transplant from another deflected septum, on which a submucous operation is being

done. The flaps of mucous membrane are thus fashioned according to Hazletine's method, and the largest possible piece of cartilage or bone placed between them, and the sutures inserted. Both nostrils are then packed very carefully, and not distended for two or three days. Following this an ointment is used to prevent drying of the flaps. The all important point in the operation is to get as large a piece of cartilage or bone as possible, so that the whole perforated area will be filled in by the transplant.

Birkett (Rogers).

Thomson, Sir StClair.—Some of the Symptoms and Complications of Sinusitis. "The Practitioner," June, 1914.

A useful summary, especially for the general practitioner. Symptoms and complications are discussed under four heads: those in neighbouring regions; those in more distant organs; those of interference with general health; and intra-cranial complications.

Macleod Yearsley.

PHARYNX.

Woody, Samuel S. (Philadelphia).—The Use of Antitoxin in Diphtheria. "Journal of the American Medical Association," September 4, 1914.

Diphtheria antitoxin has been abundantly proved to be a specific for diphtheria, and a cure when used in correct doses at the proper time. But there has been devised no way, except empirically, of estimating the number of units needed by a particular person suffering from diphtheria. From personal observation of over 10,000 cases of diphtheria to the Philadelphia Hospital for Contagious Diseases, Dr. Woody is entirely satisfied that antitoxin, as generally used, is given in doses far too small. The object in giving antitoxin is the rapid and complete neutralisation of the diphtheria toxin by a single dose. Most cases treated are given numerous small doses, and in a good percentage of cases the patients finally recover. The endeavour should be to give at once an initial dose of such an amount of antitoxin that neutralisation will be accomplished without delay, and that possibly there will be an excess of antitoxin still in the system to combat toxins later elaborated. Too small a dose invites disaster, whereas too large a dose can do no harm and may be a safeguard for the future.

The following table indicates the large doses that the author is accustomed to give. No case of diphtheria, however mild, should receive less than 10,000 units.

Both tonsils, well covered with exudate of one or two days' duration, from 30,000 to 60,000 units.

Both tonsils, well covered with exudate, with palate, uvula and nose involved, of three or more days' duration, from 150,000 to 300,000 units.

Nasal cases, 20,000 units, if with marked symptoms of toxæmia, from 50,000 to 150,000 units.

Laryngeal cases, from 30,000 to 45,000 units.

The objections to such large doses are: (1) Danger to the patient, which is disproved by actual experience—untoward results have followed the use of moderate or even small doses just as often as after the use of large ones. Indeed, it has been shown that such a result is not due to the antitoxin bodies themselves, but to the serum alone. (2) Anaphylaxis. Its occurrence is of such great rarity that it cannot be allowed to influence us in the least. Too many lives are lost by too little antitoxin being given to allow a theoretical possibility to keep us from making a

cure. (3) Local sloughing is very rare, and will be avoided entirely by further concentration. (4) Serum sickness and serum rashes are not a bar to the use of a large dose.

With the use of large doses the mortality has been reduced to 6.02 per cent. The advantages of large doses of antitoxin are: (1) Prompter local cure; (2) quicker improvement in the patient's general condition; (3) permanence of curative action; (4) avoidance of complications; (5) reduction of mortality; (6) avoidance of pain and discomfort of repeated small doses; (7) harmlessness of large doses. *Birkett (Rogers).*

EAR.

Horne, Jobson.—**Gun Deafness and its Prevention.** "The Lancet," August 15, 1914, p. 462.

With the outbreak of war must come certain cases of rupture of the membrana tympani and labyrinthine concussion from the effect of explosions, especially in naval warfare. The author has endeavoured to meet the possible want of knowledge of these conditions by this article. He gives a *resumé* of present knowledge and advises as to prevention.

Macleod Yearsley.

Boot, G. W.—**Caisson Workers' Deafness.** "Annals of Otology etc.," vol. xxii, p. 1121.

Gives the results of an examination of thirteen workers in compressed air. From a consideration of these cases he considers that the results of caisson working on the ear are of three kinds: (1) Tubal tympanic catarrh, principally in those who are predisposed thereto by nasal conditions. (2) Symptoms referable to the vestibular system, either in its central mechanism, in course of the vestibular nerve, or in the terminal end-organs. Complete recovery is the rule. The third and most characteristic result of working under compressed air is a loss of a considerable portion of the upper range of hearing, with marked loss of bone conduction. In a few cases the whole organ of Corti was apparently destroyed suddenly after coming out of the air-lock. As a rule, the loss is gradual, and is comparable to that in boilermakers' deafness.

Macleod Yearsley.

BOOKS RECEIVED.

The Tonsils, Faucial, Lingual and Pharyngeal, with some Account of the Posterior and Lateral Pharyngeal Nodules. By *Harry A. Barnes, M.D.*, Instructor in Laryngology, Harvard Medical School. Illustrated. London: Henry Kimpton, 263, High Holborn, W.C.; Glasgow: Alex. Stenhouse, 40 and 42, University Avenue. Price 12s. 6d. net.

Operative Surgery of the Nose, Throat, and Ear, for Laryngologists, Rhinologists, Otologists and Surgeons. By *Hannu W. Loeb, A.M., M.D.* In two volumes. Vol. I, Illustrated. London: Henry Kimpton; Glasgow: Alexander Stenhouse, 1914. Cash price (2 vols.) £2 10s.

Diseases of the Labyrinth. By *Dr. Erich Ruttin*, Privatdocent in the Otological Clinic, University of Vienna. Authorised translation by *Horace Newhart, A.B., M.D.*, Instructor in Otology, University of Minnesota. Illustrated. London: William Heinemann. Price 8s. 6d. net.

INDEX TO VOLUME XXIX, 1914.

SUBJECTS.

	PAGE
Abductor paralysis, <i>see</i> Cord, vocal.	
Acoustic tracts, subsidiary (A. Kreidl)	543
Adductor paralysis, <i>see</i> Cord, vocal.	
Adenoids, effects of (O. Paget)	384
—— operation on, results (W. Wilson, F. Warner)	329
—— ——— osteotomy following (R. H. H. Jolly)	328
—— ——— trauma from (H. L. Whale)	159
Adrenalin in treatment by salvarsan.	168
Air-passages, upper, diseases of, vaccine treatment of (D. Harmer)	389
—— ——— plasmacytoma of (H. Wachter)	391
—— ——— vaso-motor disturbance of (C. W. Richardson)	510
American Laryngological Association, proceedings of the	45
—— ——— Rhinological, and Otological Society, proceedings of the	39, 100, 379
Anæsthesia, ethyl chloride and respiratory stoppage (J. D. Lithgow)	92
—— general, a new method of (W. Freudenthal)	447
—— Local, Text-book of, by Prof. Dr. George Hirschel (review, D. McKenzie)	544
Anæsthetics, by Dudley W. Buxton (review, J. D. Mortimer)	480
Antroscope, maxillary (Dan McKenzie)	507
Antrostomy, nasal (P. Watson-Williams, O. Levinstein)	113, 329, 429
Antrum, maxillary, endothelioma of (A. Brown Kelly)	471
—— ——— epithelioma of (W. Stuart Low)	506
—— ——— operation on, intranasal technique of (P. Watson-Williams)	113, 429
—— ——— puncture of, dangers of (Killian, H. M. Bowen, Brown Kelly)	216, 219, 556, 557
Aphonia, congenital syphilitic laryngitis (W. H. Jewell)	159
—— ——— functional, treatment of (C. Macmahon)	331
Arytænid, fixation of (S. H. Mygind, G. Wilkinson)	331, 426
Asthma and its Radical Treatment, by Jas. Adam (review, P. Watson-Williams)	54
Atrophic rhinitis, <i>see</i> Rhinitis, atrophic.	
Atropin, effect on voice (Cisler)	166
Auditory centre, localisation of (Boyd and Hopwood)	479
—— nerve, division of the, for tinnitus (C. H. Frazier)	222
—— ——— tumour of the (J. S. Fraser)	164
Auricle, <i>see also</i> Ear, external.	
—— hæmatoma of (Krüger)	445
—— herpes zoster of (H. J. Davis)	314
—— trichophyton granuloma affecting (H. Tod)	26
Bone-conduction in syphilis (Oscar Beck)	388
Brain, abscess of, <i>see</i> Brain, temporo-sphenoidal lobe of, and Cerebellum.	
—— acoustic tracts in (A. Kreidl)	543
—— auditory centre of (Boyd and Hopwood)	479
—— centre for nystagmus in (G. J. Jenkins)	23

	PAGE
Brain, operative trauma of, recovery (Dan McKenzie)	34
—— temporo-sphenoidal lobe of, abscess of (W. G. Porter, J. Kerr Love, H. L. Whale)	95, 540, 580
British Medical Association, The, Section of Oto-Laryngology, meeting at Aberdeen July, 1914	279
—— ——— proceedings of the	481, 487, 496, 513, 520, 524, 532, 576
Bronchial calculus (W. F. Chappell)	45
Broncholith (W. F. Chappell)	45
Bronchus, foreign body in (D. R. Paterson)	79, 147
—— ——— removal by suction (H. Tilley)	80
Carbolic acid and glycerine for turbinal hypertrophy (J. D. Lithgow and Peel Ritchie)	92
Cavernous sinus, <i>see</i> Sinus, cavernous.	
Cerebello-pontine angle, tumour of (J. S. Fraser, W. M. Mollison)	164, 315
Cerebellum, <i>see also</i> Brain.	
—— abscess of (W. Milligan, H. Whitehouse and J. G. Galbraith)	142, 441
—— ——— a new symptom of (M. Mann)	446
—— ——— multiple operation, recovery (C. E. West)	312
Cerebro-spinal rhinorrhœa (P. Watson-Williams and discussion)	82
Cholesteatoma, large (N. Maclay)	470
—— spontaneous cure by (J. Adam)	473
Clinical Congress of Surgeons, London, 1914	327
Colds in the head (L. Hill and F. F. Muecke)	165
"Compendium of the Pharmacopœias and Formularies," by C. J. S. Thompson, review (Macleod Yearsley)	480
Cord, vocal, <i>see also</i> Larynx and laryngeal nerve.	
—— abductor paralysis of, bilateral (J. B. Layton, C. W. M. Hope)	154, 431
—— adductor paresis (E. D. Davis)	205, 432
—— fixation of, without symptoms (H. J. Davis)	89
—— infiltration of (E. A. Peters)	157
Cranial nerve, sixth, paralysis of, from abscess in petrous bone (G. Wilkinson)	409
—— nerves, third, fourth, fifth and sixth, rhinogenic and otogenic lesions of the (L. Onodi)	304, 360
Crico-arytenoid joint, rheumatism of (S. H. Mygind)	331
Dacryocystotomy, intranasal (L. Polyák, D. R. Paterson)	48, 169, 423
Deaf-mutism, prevention of (Macleod Yearsley)	221
Deafness, aids to hearing in (W. S. Bryant, G. J. Jenkins)	12, 523
—— associated with Bárány's symptom complex (Bárány)	2
—— caisson workers (G. W. Boot)	600
—— case of, for diagnosis (Somerville Hastings)	147
—— fracture of skull causing (W. M. Mollison)	23
—— from gun fire (Jobson Horne)	600
—— increased bone-conduction in obstructive, theories of (Heschl)	332
—— nerve, with anæmia (Dan McKenzie)	581
—— radium treatment of (Retzius, J. Walker-Wood, M. Halle)	56, 112
—— re-education treatment of (A. Raoult, H. Lavrand, R. Lake, J. Mackenzie Booth, F. F. Muecke)	108, 109, 111, 318, 466, 524, 543
—— serous meningitis causing (Bárány)	2
—— sudden non-syphilitic, in children (J. Kerr Love)	639
—— syphilitic, bone-conduction in (Oscar Beck)	388
—— treatment of, by radium	56
Diathermy (Allbanns)	216
—— in inoperable growths of nose and throat (W. D. Harmer)	481
Die Städtische Ohrenklinik Frankfurt a. M., by von Prof. Dr. Otto Voss (review, Dan McKenzie)	392
Diphtheria, diagnosis and treatment of (J. B. Greene)	442
—— use of antitoxin in (S. S. Woody)	599

	PAGE
Diseases of the Nose, Throat and Ear, by Francis R. Packard, M.D., (review, P. Watson-Williams)	167
——— of the Ear, by Philip D. Kerrison (review, Macleod Yearsley)	55
Dura mater, operative trauma of, in middle turbinotomy (Kümmel)	216
——— treatment (Dan McKenzie)	34
Dysphagia from <i>eventratio diaphragmatica</i> (Marx)	217
Ear, atrophy of (N. Sack)	511
——— cancer of (G. J. Jenkins and G. F. Stebbing, W. Milligan, Sydney Scott)	27, 141, 143, 585
——— cholesteatoma of (N. Maclay)	470
——— diseases of, affections of cranial nerves in (L. Onodi, F. H. West- macott)	304, 360, 449
——— pathology of, demonstration (J. S. Fraser)	161
——— external, cancer of, extensive operation, recovery (W. Milligan)	141
——— deformities of (J. H. Connolly)	318
——— injury of, operation for (J. Barr)	436
——— hæmatoma of, operation for (G. J. Jenkins)	146, 586
——— injury to (W. M. Mollison)	22
——— gunshot (J. B. Rae)	478
——— internal, <i>see</i> Labyrinth.	
——— malignant, disease of, <i>see</i> Ear, cancer of.	
——— middle, suppurat. of, with abscess in petrous bone (G. Wilk- inson)	409
——— acute, from "mucosus" and Friedländer infec- tions (E. Storath)	276
——— Schwartze operation, results of (J. Hewat)	261
——— without rupture of tympanic membrane (J. S. Fraser)	284
——— chronic, and life insurance (E. Amberg)	278
——— in infants, treatment of (W. C. Phillips)	382
——— ossiculotomy (E. D. Davis)	584
——— pseudo-diphtheria bacillus in (Reh and Méroz)	52
——— retropharyngeal abscess from (S. Gatscher)	53
——— topography of (J. A. Cavanaugh)	334
——— tuberculosis of (J. S. Fraser, E. D. Davis)	163, 582, 584
——— Plaut-Vincent infection of (J. Adam)	538
Earache, treatment of (A. Schwarz)	445
Edinburgh Royal Infirmary. Reports for the year 1913 from the Ear and Throat Department of (A. Logan Turner)	57, 133, 184, 261, 284
——— statistical tables of (J. Hewat)	133
Endoscopic examination of larynx, etc. (G. Killian, Chevalier Jackson and discussion)	323, 360
Epiglottis, cancer of (Emil Mayer)	45, 328
——— removal (P. R. W. de Santi)	90
Epistaxis, <i>see</i> Nose, hæmorrhage from.	
Ethmoid bone, carcinoma of (J. Walker Downie)	436
——— endothelioma of (Dan McKenzie)	83
——— malignant disease of (H. J. Davis)	504
——— cells, Harris Mosher's operation on (H. Luc)	330
Ethyl chloride and respiratory obstruction (J. D. Lithgow)	92
Eustachian bougie, a new (W. H. Kelson)	75
——— tube, diseases of, treatment of, direct (J. Walker Wood, W. C. Braislin)	116, 479
Eventratio diaphragmatica causing dysphagia (Marx)	217
External rectus muscle, paralysis of, from abscess in petrous bone (G. Wilkinson)	409
Face, unilateral atrophy of (N. Sack)	511
Facial nerve, atrophy of (N. Sack)	511

	PAGE
Fifth Nerve (Trigeminus), Map Scheme of the Sensory Distribution of the etc., by L. Hemington Pegler (review, Dundas Grant)	109
Foreign bodies, colour of, hindering discovery of (D. R. Paterson)	147
Frontal sinus, <i>see</i> Sinus, frontal.	
German Laryngologists, The Proceedings of the Society of, 1913	215
Geschichte der Ohrenheilkunde, by Dr. Adam Politzer (review, Dundas Grant)	334
Goitre, <i>see also</i> Thyroid gland.	
—— congenital (S. Pern)	386
—— with severe pressure symptoms (Dan McKenzie)	36
Hæmatoma auris <i>see</i> Ear.	
Hæmorrhoids and bulbar tonicity (P. Bonnier)	384
Hay fever, ætiology of (A. Coolidge, T. Smith)	50
—— treatment of (H. L. Ulrich)	511
—— vaccine treatment of (A. G. H. Lovell)	219
Haynes' operation for meningitis (E. W. Day, E. D. Dench)	100, 222
Hearing, test for (M. Kabatschnik)	51
—— theory of, new (F. P. Sturm)	193
Heart, valvular disease of, and recurrent paralysis (Killian, Sobernheim and Caro)	215, 219
Herpes zoster of auricle (H. J. Davis)	314
—— Oticus (A. Jaehne)	281, 333
Hoarseness from rheumatism (S. H. Mygind)	331
—— prolonged (J. K. Milne Dickie)	98
Hughlings Jackson-Mackenzie syndrome (H. J. Davis)	32
Hyperostosis cranii (H. Lambert Lack)	30
Hyperplasia of mucous membrane (A. Logan Turner)	57
Hypopharynx, <i>see</i> Pharynx lower.	
Hypophysis, <i>see</i> Pituitary body.	
Insurance, life, and middle-ear suppuration (E. Amberg)	278
International Collective Investigation of Ozæna (A. Brown Kelly)	255
International Congress of Medicine, Reports of, Section of Laryn- gology	323, 372
—— ——— ——— Section of Otology	268
Jaw, <i>see</i> Maxilla.	
Kinesiphone, Maurice's (J. Mackenzie Booth)	466
Labyrinth, <i>see also</i> Cochlea, Semi-circular canals and Vestibular apparatus.	
—— anatomy of, in birds (Urban Pritchard)	1
—— operation on the, <i>see</i> Labyrinthotomy.	
—— sequestrum of the (E. P. Fowler)	220
—— syphilis of the (O. Glogan)	220
Labyrinthitis, (E. P. Fowler)	220
—— and meningitis (J. G. Connal)	439
—— literature of (J. S. Fraser)	294
—— pathology of (E. Ruttin, G. J. Jenkins)	220, 587
—— recovery from, without labyrinth operation (F. W. Bennett and Dan McKenzie)	141
—— serous (J. S. Fraser)	212
—— symptoms of, in suppuration of ear (J. S. Fraser)	211
—— without rupture of tympanic membrane (J. S. Fraser)	284
Labyrinthotomy for vertigo (R. Lake, W. H. Kelson)	144, 318
—— indications for (R. Leidler)	220
Lachrymal apparatus, intra-nasal operations on (L. Polyák, D. R. Paterson)	48, 169, 423

	PAGE
Lachrymal organs, Relation of the, to the Nose, etc., by Prof. Dr. A. Onodi (review, P. Watson-Williams)	110
Laryngeal nerves, recurrent, paralysis of (W. H. Kelson, J. Walker Downie)	434, 435
— — — — — in heart disease (G. Killian, Sobernheim and Caro)	215, 219
— — — — — recurrent, paralysis of, from lymphomatous glands (H. J. Davis)	500
— — — — — from œsophageal cancer (E. A. Peters)	37, 510
— — — — — superior, paralysis of, from disseminated sclerosis (J. Donelan)	33, 430
— — — — — pressure on, for tuberculous dysphagia (Rethi)	217
— — — — — snoring (W. F. Chappell)	42
— — — — — stridor, tracheotomy (J. K. Milne Dickie)	99
Laryngectomy, speech after (E. W. Scripture)	275
Laryngitis, chronic (A. Wylie)	160
— — — — — congenital syphilitic (?) (W. H. Jewell)	159
Laryngo-fissure, <i>see</i> Thyrotomy.	
Laryngoscopy, autoscopic (Panconcellia-Calzia)	444
— — — — — autostatic (Robert-Leroux)	444
— — — — — direct, a new method (Katzenstein)	218
— — — — — suspension (E. D. Davis, M. Mayer, G. Killian, W. Freudenthal)	206, 328, 337, 351, 393
— — — — — for laryngeal papilloma (W. Albrecht)	71
Larynx, abscess of, metastatic, in pyæmia (R. Imhofer)	275
— — — — — and pharynx, resection of (E. B. Waggett)	424
— — — — — cancer of, diagnosis of, value of clinical observation (Killian)	217
— — — — — thyrotomy (F. R. Packard)	166
— — — — — disease of (W. Jobson Horne)	33
— — — — — diagnosis of (W. F. Chappell)	42
— — — — — displacement of, from thoracic disease (K. M. Mentzel)	385
— — — — — fibroma of (H. J. Davis)	88
— — — — — foreign body in (Geo. Wilkinson)	426
— — — — — hyperplasia of mucous membrane of (A. Logan Turner, H. Lambert Lack)	57, 197, 319
— — — — — syphilitic (H. Lambert Lack)	197
— — — — — infection of, pneumococcal (Turner and Mollison)	85
— — — — — infiltration of, subglottic (W. T. Gardiner)	93
— — — — — injury of (J. G. Connal)	438
— — — — — lupus of (J. Walker Downie)	435
— — — — — myasthenia gravis affecting the (E. D. Davis)	203
— — — — — neoplasm of (T. B. Layton, H. D. Gillies, W. Jobson Horne, H. Tilley, J. Donelan)	87, 157, 208, 506, 510
— — — — — pachydermia of (H. Tilley)	29
— — — — — papilloma of, treated by suspension laryngoscopy (W. Albrecht)	71
— — — — — paralysis of (H. J. Davis)	32
— — — — — — from disseminated sclerosis of (J. Donelan)	33, 430
— — — — — perichondritis of, with stenosis (Wm. Hill)	38
— — — — — polypoid mass of (T. B. Layton)	87
— — — — — recurrent nerve of, <i>see</i> Laryngeal nerve, recurrent.	
— — — — — subglottic infiltration of the (J. B. Layton)	155
— — — — — stenosis of, from perichondritis (Wm. Hill)	38
— — — — — syphilis of (W. T. Gardiner, W. H. Jewell, G. H. L. Whale)	93, 159, 425
— — — — — tobacco, effect of, on the (Colombel)	107
— — — — — ventricular band of, hyperplasia of (C. I. Graham)	429
— — — — — tuberculosis of (R. Levy)	50
— — — — — — artificial pneumothorax and (E. Winckler)	107
— — — — — — combined with syphilis (Dan McKenzie)	202
— — — — — — dysphagia from, treatment of (Réthi)	217

	PAGE
Larynx, tuberculosis of, sanatorium treatment of (Sir StClair Thomson)	542
——— treatment of, history of (M. Menier)	50
——— ulceration, slight, painful (Dundas Grant)	90
——— with thyroid perichondritis (G. Potts)	156
——— tumour of, <i>see</i> Neoplasm of.	
Le Affezioni dell'Orecchio nell'Adenoidismo, by Dott. R. Vitto-Massei	
(review, Sir StClair Thomson)	223
Leontiasis ossea	30
Leukæmia, lymphatic, tonsils from (H. J. Davis)	500
Lip, lower, bilateral fistulæ of (L. M. Kahn)	479
——— primary syphilis of (H. J. Davis)	502
Little's area or <i>locus Kiesselbachii</i> (Dan McKenzie)	21
Lungs, emphysema of, causing scabbard-trachea (Kahler)	7
Mastoid bone, anatomy of (J. Mouret, W. G. Porter)	268, 322
——— Bezold's perforation of (J. G. Connal)	437
——— tuberculosis of (E. D. Davis)	582
——— operation, after-treatment of (J. Walker Wood)	278
——— cortical, results of (J. Hewat)	261
——— indications for (Sohier Bryant)	445
——— radical, dressing for (J. D. Lithgow)	91
——— for traumatic closure of meatus (T. Barr)	436
——— Schwartz's, <i>see</i> Mastoid operation, cortical.	
——— selection of (A. Randall)	277
——— steel wire-saw for (J. D. Lithgow)	323
——— region, skiagraphy of (W. G. Porter, F. M. Law, W. H. Stewart)	322, 387
Mastoiditis, without middle-ear suppuration (Dan McKenzie)	140
Maxilla, expansion of, by spring pressure (J. Adam)	474
——— inferior, deformity of (H. J. Davis)	89
——— superior, osteoma of (Delman Ritchie)	385
——— tumour of (W. Howarth)	38
Meatus, auditory, external atresia of, congenital (L. Lewin)	166
——— imperforate (H. J. Davis)	315
Meckel's ganglion, intra-nasal access to (E. M. Holmes)	43
Membrana tympani, anthracosis of (J. E. Connal)	438
Meningitis after middle turbinotomy (Kümmel)	216
——— otitic, from abscess in petrous bone (G. Wilkinson)	409
——— Haynes' operation for (E. W. Day, E. D. Dench)	100, 222
——— serous (J. G. Connal)	439
——— translabyrinthine drainage, recovery (Sydney Scott, A. Logan Turner)	23, 321
——— without rupture of the tympanic membrane (J. S. Fraser)	284
Microtia (Leo Lewin)	166
Mouth and tongue, epithelioma of (W. M. Mollison)	84
——— aphthæ, of, chronic recurring (Brown Kelly and W. Whitelaw)	472
Mucosus streptococcus and otitis (E. Storath)	276
Myasthenia gravis and the larynx (E. D. Davis)	203
Nasal reflex neuroses (O. Levinstein)	49
Naso-pharyngoscope (J. Walker Wood)	116
Naso-pharynx, adhesions in (H. L. Whale)	159
——— fibroma of (W. N. Robertson)	47
——— malignant tumours of (Kelsey and Brown)	542
——— sarcoma of, treated by radium emanation (H. Tilley, A. J. Martineau, Somerville Hastings)	150, 151
——— cicatricial web of (J. H. Connolly)	37
Neo-salvarsan, results from (E. Schlesinger)	279
Neuralgia, alcoholic treatment of, by nasal route (E. M. Holmes)	43
Nose, alar cartilages of, collapse of (O. Paget)	385
——— bleeding polypus of (W. T. Gardiner)	94

	PAGE
Nose, cancer of. (W. Stuart-Low)	506
— development of (J. M. Ingersoll)	165
— diseases of, orbito-ocular complications of (Baumgarten)	49
— external, deformities of, treatment. <i>see also</i> Rhinoplasty. — (Marshall)	54
— hæmorrhage from thrombokinas in (de Roaldes and Lynch)	274
— lupus of (G. H. L. Whale)	426
— influence of pregnancy on (E. A. Peters)	509
— lymphangitis of, from antrum suppuration (H. J. Davis)	503
— multiple telangiectasis affecting (Logan Turner)	320
— neoplasms of, inoperable, treatment of, by diathermy (W. D. Harmer)	481
— — — — — by radium (Wm. Hill)	487
— — — — — by X rays (J. Macintyre)	496
— — — — — (discussion)	533
— obstruction of, rhinomanometer in (H. A. Kisch)	88
— osteoma of (H. Lambert Lack)	39
— physiology of (O. Paget)	541
— plasmacytoma of (H. Wachter)	391
— polypus of, septal hyperplasia in (W. J. Harrison)	196
— — — — — spheno-choanal (I. Kubo)	219
— septum of, abscess of the (Dan McKenzie)	138
— — — — — and external deformity (H. J. Davis)	502
— — — — — bleeding polypus of (W. T. Gardiner)	94
— — — — — destruction of (H. J. Davis)	502
— — — — — hyperplasia of, associated with polypi (W. J. Harrison)	196
— — — — — perforation of (Douglas Harmer)	90
— — — — — treatment of (W. J. Harrison, L. W. Simpson)	74, 598
— — — — — posterior part, deflection of (N. Patterson)	207
— — — — — resection of, anæsthesia for (A. Schulz)	48
— — — — — bi-submucous (J. v. d. H. Leonhard)	419
— — — — — in childhood (Heermann)	48
— — — — — instruments for (F. H. Westmacott, J. Donelan)	87, 156
— — — — — tubercle of, reflex neuroses from (O. Levinstein)	49
— — — — — tuberculosis of (A. Brown Kelly)	471
Nystagmus (Sydney Scott and discussion)	459
— labyrinthine, cortical centre for (J. G. Jenkins)	23
Oculo-motor paralysis of otitic origin (F. H. Westmacott)	449
Œsophagoscopy (E. Killian, C. Jackson and discussion)	323, 372
— for foreign bodies, mortality of (C. Jackson)	373
— injuries resulting from (Amersbach)	446
Œsophagus, cancer of, early symptomatology of (H. H. Janeway)	447
— — — — — recurrent paralysis from (E. A. Peters)	37
— — — — — denture in, for eighteen years (D. Braden Kyle)	45
— — — — — for two and a half years (Sir StClair Thomson)	276
— — — — — foreign body in (D. R. Paterson, J. Guthrie)	148, 158
— — — — — for eight years (W. G. Porter)	97
— — — — — of baby aged two (H. J. Davis)	89
— — — — — upper end of, cancer of <i>see</i> Pharynx, lower, cancer of.	
— — — — — foreign bodies in, removal of (R. H. Johnston)	332
Orbital cellulitis from nasal sinus disease (H. A. Kisch)	428
Orbito-ocular complications of ear disease (F. H. Westmacott)	449
— — — — — of nasal disease (Baumgarten)	49
Ossiculectomy (E. D. Davis)	584
Osteomyelitis, diffuse cranial, of frontal bone (Eckstein)	275
— — — — — recovery (W. G. Porter)	96
— — — — — of sphenoid bone after adenoid operation (R. H. H. Jolly)	328
Othæmatoma, <i>see</i> Auricle, hæmatoma of.	
Otitis, <i>see</i> Ear.	

	PAGE
Otosclerosis, (A. Denker, J. S. Fraser, and Gideon Walker)	52, 211, 536
——— clinical aspect of (J. S. Fraser and Gideon Walker)	513
——— pathology of (G. J. Jenkins)	317, 587
——— note on (Kenelm H. Digley)	20
——— treatment of (G. J. Jenkins)	520
Ozæna, <i>see</i> Rhinitis, atrophic.	
Palate, cancer (?) of (W. M. Mollison)	39
——— endothelioma of (Dan McKenzie)	36
——— epithelioma of (N. Paterson)	158
——— hyperplasia of, congenital syphilitic (H. Lambert Lack)	197
——— lupus of (W. H. Kelson, J. Walker Downie)	33, 435
——— myasthenia gravis affecting the (E. D. Davis)	203
——— necrosis of (H. J. Davis)	502
——— paralysis of, following tonsil-adenoid operation (Logan Turner)	321
——— unilateral (H. J. Davis)	32
——— soft, cancer of (W. G. Howarth)	209
——— salivary adenoma of (T. Guthrie)	68, 86
——— ulcer of, perforating (W. H. Kelson)	32
Perez bacillus, vaccine of, for ozæna (Brown Kelly and J. F. Smith)	471
——— researches in ozæna (A. Brown Kelly)	255
Petrous bone, abscess of, causing paralysis of external rectus (G. Wilkinson)	409
Pharyngitis, pneumococcal (Turner and Mollison)	85
——— streptococcus, epidemic (J. A. Copps)	164
——— ulcerosa disseminata (O. Levinstein)	164
Pharyngo-laryngeal wall, cancer of (C. I. Graham)	160
Pharynx, angioma of (Dan McKenzie)	202
——— artery in, large (J. H. Conolly)	91
——— cancer of, operation (Lithgow and Ritchie, E. B. Wagget)	92, 424
——— cicatricial diaphragm of (J. F. O'Malley)	428
——— cyst of (Douglas Harmer)	434
——— diverticulum of, demonstration of (W. Hill P. Dempsey)	148
——— removal of (W. H. Kelson)	198
——— hyperplasia of mucous membrane of (A. Logan Turner)	57, 319
——— lower, cancer of (H. Tilley, Logan Turner)	28, 321
——— apparent cure by radium (J. Adam)	474
——— lupus of (W. H. Kelson)	33
——— neoplasm of, extensive (H. Tilley)	160
——— pneumococcal infection of (Turner and Mollison)	85
——— syphilitic ulcer of (H. A. Kisch)	38
——— tuberculosis of (F. W. Bennett)	160
Pituitary body, tumour of (Wm. Hill)	38
Plasmacytoma, multiple, of upper air-passages (H. Wachter)	391
Plant-Vincent infection of ear (J. Adam)	538
Pneumococcal infection of pharynx and larynx (Turner and Mollison)	85
Polycythæmia rubra with chronic rhinitis (E. A. Peters)	157
Post-cricoid region, <i>see</i> Pharynx, lower.	
Post-nasal region, <i>see</i> Naso-pharynx.	
Pregnancy and lupus of nose (E. A. Peters)	509
Principes d'Anacousie, by A. Zünd-Burquet (review, Dan McKenzie)	111
Radiography, <i>see</i> Skiagraphy.	
Radium, apparent cure of pharyngeal cancer by (J. Adam)	474
——— treatment of deafness (J. Walker Wood, Max Halle)	56, 112
——— inoperable growths of nose and throat (Wm. Hill)	487
——— emanation for naso-pharyngeal sarcoma (H. Tilley, A. J. Martineau, Somerville Hastings)	150, 151
Rectus, external, paralysis of, in ear disease (F. F. Muecke)	77
Recurrent nerve, <i>see</i> Laryngeal nerve, recurrent.	

Re-education of hearing, <i>see</i> Deafness, re-education treatment of.	
Respiratory tract, upper, a peculiar form of hyperplasia of the mucous membrane of (A. Logan Turner)	57, 319
Retro-pharyngeal abscess, operation, sudden death (Kowler)	47
——— otogenic (S. Gatscher)	53
——— space, foreign body in (E. D. Davis)	206
Rhinitis, atrophic (Johnathan Wright, F. P. Emerson)	106, 379
——— aetiology of (J. Christ, F. P. Emerson)	443
——— international investigation of (A. Brown Kelly)	255
——— Perez's bacillus, vaccine for (Brown Kelly and J. F. Smith)	471
——— ——— researches in (A. Brown Kelly)	255
——— ——— treatment of (Mahu, F. P. Emerson)	105, 379, 443
——— ——— vaccine treatment of (F. K. Cobb)	48
——— chronic with polycythæmia rubra (E. A. Peters)	157
Rhinomanometer, the (H. A. Kisch)	88
Rhinoplasty (Marshall, J. Joseph)	54, 477
Royal Society of Medicine, Proceedings of the, Laryngological Section	28, 79, 147, 197, 500, 589
——— ——— Neurological, Ophthalmological and Otological	459
Sections	
——— Otological Section	22, 75, 140, 312, 580
Salvarsan, adrenalin in treatment by	168
——— in lesions of nose and throat (C. R. C. Borden, E. Schlesinger)	278, 279
Scabbard-Trachea, <i>see</i> Trachea.	
Scottish Otological and Laryngological Society, Proceedings of the	161, 211, 319, 435, 466, 538
Semicircular canals, ampullæ of, in birds (U. Pritchard)	1
——— function of, in cochlear disease (Dan McKenzie)	464
——— sequestrum of (E. P. Fowler)	220
Semon Lecture, the, 1914 (Prof. G. Killian)	337, 393
Septum, nasal, <i>see</i> Nose, septum of.	
Sinus, antral, <i>see</i> Antrum, maxillary.	
——— cavernous, thrombosis of, after tonsillitis (H. J. Davis)	31
——— frontal, burrs for (H. Tilley)	507
——— diseases of, osteomyelitis following (Eckstein)	275
——— ——— treatment of (R. C. Myles, L. A. Coffin)	39, 40
——— ——— operation on, indications for (R. J. Myles)	542
——— ——— intra-nasal (P. Watson-Williams, H. Tilley, discussion)	210, 225, 242, 507, 512, 538, 589
——— ——— Ogston-Luc (W. Stuart-Low)	430
——— ——— scars of, obliterated (H. Tilley)	28
——— ——— trauma of dura during (Dan McKenzie)	34
——— ——— osteoma of (Citelli)	274
——— ——— suppuration of, acute, from bathing (C. W. M. Hope)	507
——— lateral, infection of, mode of production of (W. M. Mollison)	315
——— ——— thrombosis of, operation, recovery (J. Kerr Love)	540
——— ——— treatment of (G. L. Tovey)	53
——— ——— with paralysis of external rectus (F. F. Muecke)	77
——— ——— with pyæmia (F. F. Muecke)	76
——— longitudinal, thrombosis of (Eckstein)	275
——— sphenoidal, operation on (G. H. L. Whale)	425
Sinuses, nasal accessory, diseases of, affections of cranial nerves in (L. Onodi)	304, 360
——— ——— orbital cellulitis from (H. A. Kisch)	428
——— ——— orbito-ocular complications of (Baumgarten)	49
——— ——— suppuration of, in young people (Dan McKenzie)	199
——— ——— symptoms and complications (Sir StClair Thomson)	599

	PAGE
Sinuses, nasal accessory, The Catarrhal and Suppurative Diseases of the, by Ross Hall Skillern, M.D. (review, Dan McKenzie)	391
Skiagraphy and per-oral endoscopy (C. Jackson)	373
——— of mastoid region (W. G. Porter, F. M. Law, W. H. Stewart)	323, 387
Skull, fractures of base of, involving temporal bone (Kirchner, E. D. Davis)	446, 581
Snoring, laryngeal (W. F. Chappell)	42
Sound-waves, photographs of (R. Lake)	146
Spheno-palatine ganglion, <i>see</i> Meckel's ganglion.	
Sphenoid bone, osteomyelitis of, after adenoid operation (Jolly)	328
Sphenoidal sinns, <i>see</i> Sinus, sphenoidal.	
Stomatitis ulcerosa disseminata (O. Levinstein)	164
Suspension laryngoscopy (W. Albrecht, E. D. Davis, E. Mayer, G. Killian, W. Freudenthal)	71, 206, 328, 337, 381, 393
Temporal bone, anatomy of (J. Mouret, H. Frey)	268, 386
——— cancer of, operation (W. Milligan)	141
——— fracture of (W. M. Mollison, C. Kirchner)	23, 446
——— tuberculosis of (E. D. Davis)	584
Temporo-sphenoidal abscess, <i>see</i> Brain, temporo-sphenoidal lobe of.	
The Diseases of the Nose, Throat and Ear of Children in Daily Practice, by Prof. Dr. F. Goppert (review, A. R. Tweedie)	448
Throat, neoplasms of, inoperable, treatment of, by diathermy (W. D. Harmer)	481
——— ——— by radium (Wm. Hill)	487
——— ——— by X-rays (J. Macintyre)	496
——— ——— (discussion)	533
Throat, sore, <i>see</i> Pharyngitis.	
Thrombokinas for hæmorrhage (de Roaldes and Lynch)	274
Thymus gland, hypertrophy of, thymectomy (A. Jouty)	390
Thyro-glossal cyst (J. L. Howie)	471
——— causing dyspnœa (A. J. Wright)	155
——— duct, persistent, causing cough (A. Strauch)	442
——— fistula (Dan McKenzie)	434
Thyroid gland, <i>see also</i> Goitre.	
——— diseases of, and throat and nose infection (Beebe)	541
Thyrotomy (F. R. Packard)	166
Tinnitus, persistent, section of auditory nerve for (C. H. Frazier)	222
——— treatment of (W. C. Braislin)	479
Tobacco, effect of, on larynx (Colombel)	107
Tongue, leukoplakia of (J. Walker Downie)	435
——— operations on (F. Kuhn)	273
Tonsil, faucial, calculus of (J. Walker Downie)	322
——— cancer of, operations for (F. Kuhn)	273
——— enucleation of (F. A. Leslie)	273
——— by Mathieu's guillotine (P. H. Westmacott)	88
——— difficulties of (J. F. O'Malley)	218
——— forceps (J. Donelan)	34, 156
——— hæmostatic guillotine for (Hill and Elphick)	545, 576
——— histology of (Wyatt Wingrave)	181
——— in lymphatic leukaemia (H. J. Davis)	500
——— neoplasm of, fungating (H. Barwell)	161
——— operations on (T. B. Layton)	443
——— results of (J. K. Milne Dickie, Harold Whale, W. Wilson, A. Logan Turner)	184, 218, 321, 329
——— passage of bacteria through (G. B. Wood)	46
——— physiology of (L. M. Freedman, J. Gordon Wilson, F. Henke)	104, 476
——— plasma-cells in (J. Gordon Wilson)	104
——— polypus of (E. D. Davis)	37

	PAGE
Tonsil, faucial, pulmonary tuberculosis and the (E. Fletcher Ingalls) . . .	105
——— relation of cervical tuberculous adenitis to (A. Philps Mitchell) . . .	321
——— sarcoma of (Logan Turner) . . .	321
Tonsillectomy. <i>see</i> Tonsil, faucial, enucleation of.	
Tonsillitis, acute, salicylate of iron for . . .	56
——— follicular, cavernous sinus thrombosis after (H. J. Davis) . . .	31
Tonsillotomy, death after (Dan McKenzie) . . .	35
Trachea, displacement of, from thoracic disease (K. M. Mentzel) . . .	385
——— the scabbard-, from pulmonary emphysema (Kahler) . . .	7
Tracheotomy, transverse incision in (O. Franck) . . .	444
Tricophyton granuloma of auricle (Hunter Tod) . . .	26
Turbinal body, <i>see also</i> Nose.	
——— canterisation of, effects of (Pierre Bonnier) . . .	384
——— hypertrophy of, treatment (J. D. Lithgow) . . .	92
——— bone, middle, removal of (W. S. Renner) . . .	48
——— followed by meningitis (Kümmel) . . .	216
Tympanic cavity, <i>see</i> Ear, middle.	
——— membrane, <i>see</i> Membrana tympani.	
Urotropin for meningitis (A. Logan Turner) . . .	321
Uvula, cavernous angioma of (Dan McKenzie) . . .	202
Vaccine treatment of inflammations of upper air-tract (Douglas Harmer) . . .	389
Vertigo, aural, labyrinthotomy for (R. Lake, W. H. Kelson) . . .	144, 318
Vestibulotomy, <i>see</i> Labyrinthotomy.	
Voice, effect of atropin on (Cisler) . . .	166
X rays, <i>see also</i> Skiagraphy.	
——— treatment by, for inoperable cancer (J. Macintyre) . . .	496

AUTHORS.

ADAM (James), cancer of hypopharynx . . .	474
——— cholesteatoma . . .	473
——— expansion of jaw . . .	474
——— Plaut-Vincent infection of ear . . .	538
ALBANUS, diathermy . . .	216
AMBERG (E.), middle-ear suppuration . . .	278
AMERSBACH (K.), œsophagoscopy . . .	446
BÁRÁNY (R.), deafness from meningitis . . .	2
BARR (Thomas), traumatic closure of meatus . . .	436
BARWELL (Harold), tumour of tonsil . . .	161
BAUMGARTEN, nasal orbito-ocular disturbances . . .	49
BECK (Oscar), syphilitic deafness . . .	388
BENNET (F. W.), tuberculosis of pharynx . . .	160
——— and MCKENZIE (Dan), labyrinthitis . . .	141
BEEBE (S. P.), hyperthyroidism and the nose and throat . . .	541
BIRKETT (H. S.) and ROGERS, abstracts . . .	
50, 54, 104, 105, 164, 222, 275, 278, 511, 541, 598, 599	
BONNIER (Pierre), hæmorrhoids and bulbar toxicity . . .	384
BOOT (G. W.), caisson workers' deafness . . .	600
BOOTH (J. Mackenzie), re-education of hearing . . .	466
BORDEN (C. R. C.), salvarsan . . .	278
BOWEN (H. M.), dangers of antral puncture . . .	219
BOYD (W.) and HOPWOOD (J. S.), cerebral auditory centre . . .	479

	PAGE
BRADY (A. J.), abstracts	47, 384, 385, 386, 541
BRAISLIN (W. C.), treatment of tinnitus	479
BRYANT (W. Sohler), aids to hearing	12
—— mastoid hearing	445
CAPPS (Joseph A.), epidemic sore throat	164
CAVANAUGH (John A.), topography of the tympanum	334
CHAPPELL (Walter F.), broncholith	45
—— laryngeal diagnosis	42
CHRIST (J.), ozaena	443
CISLER, atropin poisoning	166
CITELLI, frontal sinus osteoma	274
COBB (F. K.), atrophic rhinitis	48
COFFIN (Lewis A.), frontal sinus disease	40
COLOMBEL, tobacco laryngitis	107
CONNAL (J. Galbraith), anthracosis of tympanic membrane	438
—— Bezold's abscess	437
—— labyrinthitis and meningitis	439
—— laryngeal trauma	438
—— and WHITEHOUSE (H.), cerebellar abscess	441
CONOLLY (J. H.), deformities of external ear	318
—— large pharyngeal artery	91
—— nasopharyngeal web	37
COOLIDGE (A.), hay-fever	50
DAVIS (E. D.), abductor paresis	205, 432
—— foreign body in retro-pharyngeal space	206
—— fracture of temporal bone	581
—— myasthenia gravis	203
—— ossiculectomy	584
—— polyp of tonsil	37
—— suspension laryngoscopy	206
—— tuberculosis of mastoid	582, 584
DAVIS (H. J.), abnormal pharyngeal artery	502
—— cancer of ethmoid	504
—— cavernous sinus thrombosis	30
—— deformity of lower jaw	89
—— destruction of nasal septum	502
—— fixation of cord	89
—— foreign body in œsophagus	89
—— herpes zoster of auricle	314
—— imperforate meatus	315
—— laryngeal fibroma	88
—— lymphangitis of nose and cheeks	503
—— lymphatic leukaemia	500
—— necrosis of palate	502
—— paralysis of cord and palate	31
—— primary syphilis of lip	502
—— recurrent paralysis	500
DAY (Ewing W.), Haynes operation	100
DE ROALDES (A. W.) and LYNCH (C.), thrombokinasé	274
DE SANTI (P. R. W.) cancer of epiglottis	90
DEMPSEY (Patrick), pharyngeal diverticulum	148
DENCH (E. D.), Haynes operation for meningitis	222
DENKER (Alfred), otosclerosis	52
DICKIE (J. K. Milne), laryngeal stridor	99
—— prolonged hoarseness	98
—— tonsil operations	184
DIGBY (Kenelin H.), otosclerosis	20
DONELAN (J.), disseminated sclerosis	33, 430
—— instruments for septal resection	156

	PAGE
DONELAN (J.), neoplasm of vocal cord	510
—— tonsil forceps	34, 156
DOWNIE (J. Walker), calculus of tonsil	322
—— cancer of ethmoid	436
—— leukoplakia of mouth	435
—— lupus of palate, etc.	435
—— recurrent nerve paralysis	435
ECKSTEIN, osteomyelitis of frontal bone	275
ELPHICK (G. J. F.), HILL (Wm.), and, tonsillectomy	545, 576
EMERSON (Francis P.), <i>ozæna</i>	379
FOWLER (E. P.), sequestrum of semicircular canals	220
FOX (H. CLAYTON), abstracts	47, 105, 274, 330, 390
FRANK (O.), tracheotomy	444
FRASER (J. S.), abstracts 48, 49, 50, 107, 164, 166, 273, 275, 279, 329, 443, 444	
—— demonstration of diseases of ear	161
—— labyrinth symptoms in aural suppuration	211
—— labyrinthitis and meningitis	284
—— serous labyrinthitis	212
—— and WALKER (Gideon), otosclerosis	211, 513
FRAZIER (C. H.), section of auditory nerve	222
FREEDMAN (L. M.), function of tonsil	104
FREUDENTHAL (Wolff), general anæsthesia	447
—— suspension laryngoscopy	381
FREY (Hugo), anatomy of temporal bone	386
GARDINER (W. T.), bleeding polypus of septum	94
—— laryngeal syphilis	93
GATSCHER (Siegfried), otitic retro-pharyngeal abscess	53
GILLIES (H. D.), tumour of vocal cord	157
GLOGAN (Otto), labyrinth syphilis	220
GRAHAM (C. I.), hyperplasia of ventricular band	429
—— pharyngo-laryngeal cancer	160
GRANT (J. Dundas), reviews	109, 334
—— tuberculous ulcer of larynx	90
GREENE (J. B.), diphtheria	442
GUTHRIE (Thomas), abstracts 48, 49, 219, 328, 331, 385, 386, 391, 446, 447, 476, 479	
—— foreign bodies in œsophagus	158
—— salivary adenoma of palate	68, 86
—— translation	215
HARMER (Douglas), cyst of pharyngeal wall	434
—— diathermy for growths of nose and throat	481
—— perforation of nasal septum	90
—— vaccine treatment	389
HARRISON (W. J.), septal hyperplasia	196
—— septal perforations	74
HASTINGS (Somerville), deafness, diagnosis	147
—— radium for naso-pharyngeal sarcoma	151
HEERMANN, septal resection in childhood	48
HENKE (F.), function of tonsils	476
HESCHL (Friedrich), obstructive deafness	332
HEWAT (J.), cortical mastoid operation	261
—— statistical tables	133
HILL (Leonard) and MUECKE (F. F.), colds in the head	165
HILL (W.), diverticulum of pharynx	148
—— perichondritis of larynx	33
—— pituitary tumour	38
—— radium for growths of nose and throat	487
—— and ELPHICK (G. J. F.), tonsillectomy	545, 576

	PAGE
HOLMES (E. M.), injection of Meckel's ganglion	43
HOPE (C. W. M.), double abductor paralysis	431
—— frontal sinusitis from bathing	507
HORGAN (J. B.), abstracts	273, 386, 442, 444, 446, 477
HORNE (W. Jobson), gum-deafness	600
—— laryngeal disease	33
—— laryngeal neoplasm	208
HOWARTH (W. G.), cancer of palate	209
—— tumour of superior maxilla	38
HOWIE (J. L.), thyroglossal cyst	471
HUTCHISON (A. J.), abstract	53
IMHOFFER (R.), abscess of larynx	275
INGALLS (E. Fletcher), tuberculosis and the tonsils	105
INGERSOLL (J. M.), development of the face	165
JACKSON (Chevalier), endoscopy	372
JAEHNE (A.), herpes zoster oticus	333
JANEWAY (H. H.), cancer of œsophagus	447
JENKINS (G. J.), hamatoma auris	146, 586
—— histology of otosclerosis	317, 537, 587
—— labyrinthitis	587
—— treatment of otosclerosis	520
—— and STEBBING (G. F.), cancer of ear	27, 585
JEWELL (W. H.), aphonia	159
JOHNSTON (Richard H.), foreign bodies in œsophagus	332
JOLLY (R. H. H.), osteomyelitis after adenoid operation	328
JOSEPH (J.), rhinoplasty	477
JOUTY (Antoine), thymectomy	390
KABATSCHNIK (M.), new hearing test	51
KAHLER (Prof.), scabbard-trachea	7
KAHN (L. M.), fistula of lower lip	479
KATZENSTEIN, direct laryngoscopy	218
KELLY (A. Brown), endothelioma of antrum	471
—— exploratory puncture of antrum	556
—— ozæna	255
—— tuberculosis of nose	471
—— and SMITH (J. F.), vaccine treatment ozæna	471
—— and WHITELAW (William), aphthæ of mouth	472
KELSEY (A. L.) and BROWN (J. M.), cancer of naso-pharynx	542
KELSON (W. H.), labyrinthotomy for vertigo	318
—— lupus of pharynx	33
—— new Eustachian bougie	75
—— perforating palatal ulcer	32
—— recurrent nerve paralysis	434
—— removal of pharyngeal pouch	198
KILLIAN (G.), dangers of puncture of antrum	216
—— endoscopic methods	323
—— laryngeal cancer	217
—— recurrent paralysis in heart disease	215
—— suspension laryngoscopy	337, 393
KIRCHNER (Carl), fractures of base of skull	446
KISCH (H. A.), orbital cellulitis	428
—— rhinomanometer	88
—— syphilis of pharynx	38
KOWLER, retropharyngeal abscess	47
KREIDL, acoustic tracts	543
KRÜGER, othæmatoma	445
KUBO, spheno-choanal polypus	219
KUHN (Franz), surgery of mouth	273
KÜMMEL, meningitis from middle turbinotomy	216

	PAGE
KYLE (D. Braden), denture in œsophagus	45
LACK (H. Lambert), osteoma of nose	30
——— presidential address	532
——— syphilitic thickening of palate	197
LAKE (R.), aural vertigo operation	144
——— re-education treatment of deafness	318, 543
——— sound wave photographs	146
LAVRAND (H.), phonatory ear massage	109
LAW (Fred M.), skiagraphy of mastoid	387
LAYTON (T. B.), bilateral abductor paralysis	154
——— fixed crico-arytenoid joint	86
——— laryngeal disease	87
——— laryngeal tumour	87
——— subglottic swelling	155
——— tonsil and adenoid operations	443
LEIDLER (R.), labyrinthotomy	229
LEONHARD (J. van der Hoeven), bi-submucous resection	419
LESLIE (F. A.), tonsil enucleation	273
LEVINSTEIN (Oswald), nasal antrostomy	329
——— nasal reflex neuroses	49
——— stomatitis ulcerosa disseminata	164
LEVY (Robert), laryngeal tuberculosis	50
LEWIN (Leo), atresia of auditory meatus	166
LITHGOW (J. D.), abstracts	107, 108, 109, 384, 444
——— ethyl chloride	92
——— mastoid dressing	91
——— wire saw for mastoid operation	323
——— and PEEL RITCHIE, cancer of pharynx	92
——— ——— turbinal hypertrophy	92
LOVE (J. Kerr), lateral sinus thrombosis	540
——— sudden non-syphilitic deafness in children	539
——— temporo-sphenoidal abscess	540
LOVELL (A. G. Haynes), hay-fever	219
LUC (H.), operation on ethmoid	330
MACINTYRE (J.), X-rays for inoperable cancer	496
MCKENZIE (Dan), angioma of uvula	202
——— endothelioma of ethmoid	83
——— ——— of palate	36
——— laryngeal tuberculosis with syphilis	202
——— mastoiditis	140
——— maxillary antroscope	507
——— nasal septal abscess	138
——— nasal sinus suppuration	199
——— nerve deafness and anæmia	581
——— operative trauma of dura	34
——— tonsillotomy, death	35
——— and BENNETT (F. W.), labyrinthitis	141
MACLAY (Neil), cholesteatoma	470
MACMAHON (Cortlandt), functional aphonia	331
MAHU (G.), ozæna	105
MANN (Max), cerebellar abscess	446
MARSHALL, external nasal deformities	54
MARTINEAU (A. J.), radium for naso-pharyngeal sarcoma	151
MARX, <i>eventratio diaphragmatica</i>	217
MAYER (Emil), cancer of epiglottis	45
——— reports	45
MENIER (Marius), laryngeal tuberculosis	59
MENTZEL (K. M.), displacement of larynx	385
MILLIGAN (Sir W.), cancer of ear	114

	PAGE
MILLIGAN (Sir W.), cerebellar abscess	142
MITCHELL (A. Philp), tonsils and tuberculosis	213
MOLLISON (W. M.), cerebello-pontine lesion	315
—— epithelioma of mouth	84
—— injury to ear	22
—— lateral sinus thrombosis	315
—— palatal cancer (?)	39
—— and TURNER (Phillip), pneumococcal pharyngitis	85
MORTIMER (J. D.), review	480
MOURET, (J.), anatomy of mastoid	268
MUECKE (F. F.), auditory re-education	524
—— lateral sinus thrombosis	76, 77
—— and HILL (Leonard), colds in the head	165
MYGIND (S. H.), rheumatism of crico-arytænoid joint	331
MYLES (R. C.), frontal sinus disease	39, 542
O'MALLEY (J. F.), pharyngeal diaphragm	428
—— tonsillectomy	218
ONODI (L.), rhinogenic and and otogenic lesions of cranial nerves	304, 360
PACKARD (F. R.), thyrotomy	166
PAGET (Owen), adenoids	384
—— nasal obstruction	384
—— physiology of nose	541
PANCONCELLIA-CALZIA, the autophonoscope	444
PATERSON (D. R.), endoscopy	147
—— foreign body in bronchus	79
—— intra-nasal treatment of lachrymal disease	169, 423
—— translation	337
PATTERSON (Norman), epithelioma of soft palate	158
—— posterior septal deflection	207
PERN (S.), congenital goitre	386
PETERS (E. A.), abductor paresis	510
—— laryngeal infiltration	157
—— cesophageal cancer	37
—— polycythæmia rubra	157
—— pregnancy and lupus of nose	509
PHILLIPS (Wendell C.), otorrhœa in infancy	382
POLYÁK (L.), dacryocystostomy	48
PORTER (W. G.), cesophageal foreign body	97
—— osteomyelitis of frontal bone	96
—— skiagraphy of mastoid region	322
—— temporo-sphenoidal abscess	95
POTTS (G.), laryngeal tuberculosis	156
PRITCHARD (Urban), anatomy of semicircular canals	1
RAE (John B.), gunshot wound of ear	478
RANDALL, mastoid operations	277
RAOULT, auditory re-education	108
REH and MÉROZ, otitis media	52
RENNER (W. Scott), removal of middle turbinal	48
RENSHAW (J. A. Knowles) abstracts	50, 274, 277
RETHI, laryngeal tuberculosis	217
RICHARDSON (C. W.), vaso-motor disturbances	510
RITCHIE (Delman), osteoma of superior maxilla	385
ROBERT-LEROUX, laryngoscopy	444
ROBERTSON (W. N.), naso-pharyngeal fibroma	47
ROLLESTON (J. D.), Vincent's angina	273
RUTTIN (Erich), labyrinthitis	220
SACK (N.), hemifacial atrophy	511

	PAGE
SCHLESINGER (E.), neo-salvarsan	279
SCHWARZ (Adolf), earache	445
SCOTT (Sydney), cancer of ear	143
——— meningitis, recovery	23
——— vestibular reactions	459
SCRIPTURE (E. W.), speech without a larynx	275
SIMPSON (W. Likely), septal perforations	598
SMITH (J. F. A.), and BROWN KELLY, vaccine treatment of ozæna	471
SMITH (T.), hay-fever	50
SOBERNHEIM and CARO, recurrent paralysis	219
STEBBING (G. F.) and JENKINS (G. J.), cancer of ear	27
STEWART (Wm. H.), skiagraphy of mastoid	387
STORATH (E.), capsulated cocæus otitis	276
STRAUCH (August), thyro-glossal duct	442
STUART-LOW (W.), epithelioma of antrum	506
——— frontal sinus operation	430
STURM (F. P.), new theory of hearing	193
SYME (W. S.), reports	91, 161, 211, 319, 435, 466, 538
THOMSON (Sir StClair), foreign body in œsophagus	276
——— laryngeal tuberculosis	542
——— review	223
——— sinusitis	599
TILLEY (Herbert), foreign body in bronchus	80
——— frontal sinus operation	28
——— intra-nasal frontal sinus operation	242, 507
——— laryngeal neoplasm	506
——— pachydermia of larynx	29
——— pharyngeal cancer	28
——— tumour	160
——— radium for naso-pharyngeal sarcoma	150
TOD (Hunter), trichophyton granuloma of auricle	26
TOVEY (G. L., jun.), lateral sinus thrombosis	53
TURNER (A. Logan), cancer of œsophagus	321
——— Edinburgh reports	57, 133, 184, 261, 284
——— meningitis, recovery	321
——— multiple telangiectasis	320
——— peculiar hyperplasia of pharynx	57, 319
——— results of tonsil-adenoid operation	321
——— sarcoma of tonsil	321
TURNER (Phillip) and MOLLISON (W. M.), pneumococcal pharyngitis	85
TWEEDIE (A. R.), abstracts	51, 53, 166, 332, 388, 445, 511, 543
——— review	448
——— translation	2
ULRICH (Henry L.), hay-fever	511
VÉREL (Raymond), abstracts	273, 389
WACHTER (H.), plasmacytoma of nose	391
WAGGETT (E. B.), resection of pharynx and larynx	424
WALKER (Gideon) and FRASER (J. S.), otosclerosis	211, 513
WARNER (F.), muscular exercises after adenoid operation	329
WATSON-WILLIAMS (P.), cerebro-spinal rhinorrhœa	82
——— intra-nasal frontal sinus operation	210, 225, 512, 589
——— nasal antrostomy	113, 429
——— reviews	54, 110, 167
WEST (C. E.), cerebellar abscess	312
WESTMACOTT (F. H.), submucous resection	87
——— tonsil enucleation	88

	PAGE
WHALE (G. H. L.), gummatous laryngitis	425
—— lupus of nose	426
—— naso-pharyngeal adhesions	159
—— reports	532, 576
—— sphenoidal sinus operation	425
—— temporo-sphenoidal abscess	580
—— tonsil operations	218
WHITEHOUSE (H.) and CONNALL (J. G.), cerebellar abscess	441
WHITELAW (William) and KELLY (A. Brown), aphthæ of mouth	472
WILKINSON (Geo.), fixation of arytenoid	426
—— foreign body in larynx	426
—— otitic paralysis of external rectus	409
WILSON (J. Gordon), plasma cells in tonsil	104
WINCKLER (Ernst), laryngeal tuberculosis	107
WINGRAVE (Wyatt), histology of tonsil	181
WOOD (Geo. B.), bacteriology of tonsil	46
—— mastoid operation	278
WOOD (J. Walker), radium for deafness	112
—— treatment of Eustachian tube	116
WOODY (Samuel S.), antitoxin in diphtheria	599
WRIGHT (Jonathan), atrophic rhinitis	106
WRIGHT (A. J.), abstracts	106, 222, 332, 385
—— thyro-glossal cyst	155
WYLIE (Andrew), chronic laryngitis	160
YEARSLEY (Macleod), abstracts 48, 52, 53, 104, 165, 166, 218, 219, 220, 276, 278, 328, 331, 334, 387, 442, 443, 445, 478, 479, 510, 542, 543, 599, 600	
—— prevention of deaf-mutism	221
—— reviews	55, 480





SERIAL

1
1
37
1.2,

The Journal of the
American Medical Association

GERSTS

